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Kant and the Systematicity of Nature. The Regulative Use of Reason in the *Critique of Pure Reason*

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Abstract

What makes scientific knowledge possible? The philosopher Immanuel Kant in his magnum opus, the *Critique of Pure Reason*, had a fascinating and puzzling answer to this question. Scientific knowledge, for Kant, is made possible by the faculty of reason and its demand for systematic unity (or, 'systematicity'). In other words, cognition about empirical objects can aspire to be scientific only if it is rationally embedded within or transformed into a system. But how can such system form once we take into account the perspectival nature of knowledge, i.e., its being situated in individual human cognitive faculties?

My PhD thesis has a two-pronged objective: (i.) to reconstruct the complexity of the notion of systematicity in Kant's *Critique of Pure Reason*; and (ii.) to defend its plausibility in contemporary debates on the unity or plurality of scientific knowledge. As far as (i.) is concerned, Kant's position is far from being clearly understood in the literature. Despite a renewed interest in Kant's notion of systematicity in recent decades, existing contributions fail to offer a satisfactory account of it. The aim of my thesis is to provide a unified reading of reason's systematicity as an essential feature of Kant's analysis of the sources of cognition. In particular, I defend a novel account of theoretical reason the aims to support the following claims: (a.) systematicity is grounded in a legitimate use of reason's ideas as prescriptive rules for empirical investigation; (b.) it is necessary to make empirical cognition possible and generate scientific hypotheses; and (c.) it gives us fundamental insights into Kant's 'empirical realism' and his understanding of the role of metaphysics in science. With regard to (ii.), I show that Kant's account of theoretical reason has much more to offer than generally acknowledged. In particular, I present it as providing a reconciling solution to the conflict between unity and pluralism in contemporary philosophy of science. Drawing

inspiration from Kant's 'perspectivism,' I argue that unity and pluralism are to be thought as mutually inclusive principles of scientific knowledge.

Lay Abstract

This thesis reconstructs the complexity of the notion of systematicity in Immanuel Kant's *Critique of Pure Reason* (1st edition 1781, 2nd edition 1787) and defends its plausibility in contemporary debates in philosophy of science. For Kant, the demand for systematicity fundamentally characterizes human reason. If we want to know something, we are not satisfied with a chaotic aggregate of particular cognitions. We demand that such cognitions are systematized, i.e., transformed into or embedded within a system. As a result, Kant takes systematicity as the ultimate mark of a science, although its precise role and overall significance for human cognition remain puzzling aspects of his philosophical project.

Despite a renewed interest in Kant's notion of systematicity in recent decades, existing interpretations fail to offer a satisfactory account of its cognitive function. This doctoral thesis aims to fill this gap. First, I argue that systematicity is grounded in a purposive and legitimate use of human reason. Second, I show that reason's systematicity is not merely an afterthought or desideratum of our cognition, but rather a crucial feature of Kant's analysis of the sources of cognition: it fundamentally complements the faculties of our mind in a variety of tasks concerning empirical cognition, such as the unification of cognition, the formation of empirical concepts, and the approximation to empirical truth. Third, I contend that these combined insights reveal an overarching framework that helps us understand Kant's mature conception of realism (what he calls 'empirical realism') and his appraisal of the role of metaphysics in science. However, the goal is not solely historical. The dissertation also aims to defend the plausibility of Kant's systematicity in contemporary debates about whether we should aim to unify our scientific theories or rather promote their diversity and multiplicity. In particular, I argue that Kant's 'perspectivism' about reason's systematicity can be used to rethink unity and pluralism as mutually inclusive principles of

scientific cognition and thereby solve the apparent conflict between them in contemporary philosophy of science.

The thesis consists of five chapters divided into two parts. Part I reconstructs the legitimate use of the systematicity of reason within the framework of Kant's mature philosophy and discusses one example of such use (the legitimate use of the theological idea). Part II explains why the systematicity of reason has a necessary role in empirical and scientific cognition (in particular, with respect to the unity of science, empirical truth, and necessity of empirical laws).

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Note on Sources

References to Kant's *Critique of Pure Reason* follow the A/B paginations (referring to first and second editions). All other references to Kant's writings are by volume and page number of the Akademie edition (*Kant's gesammelte Schriften*, ed. Königlich-Preußische Akademie der Wissenschaften, now: Berlin- Brandenburgische Akademie der Wissenschaften, Berlin: Walter de Gruyter, 1900–). Translations follow the *Cambridge Edition of the Works of Immanuel Kant*, edited by Paul Guyer and Allen W. Wood, Cambridge: Cambridge University Press, 1992–2012, sometimes with minor alterations. In case of major alterations, these are explained in a footnote.

The following works by Kant are referred to by short titles:

A/B	*Critique of Pure Reason* (A: 1781; 4:1–252; B: 1787; Ak. 3)
Blomberg	*The Blomberg Logic* (1771?; 24:7–301)
CPJ	*Critique of the Power of Judgment* (1790; 5:165–485)
Discovery	*On a Discovery Whereby Any New Critique of Pure Reason Is to Be Made Superfluous by an Older One* (1790; 8:185–252)
Dohna	*The Dohna-Wundlacken Logic* (1792; 24:697–784)
Dreams	*Dreams of a Spirit Seer Elucidated by Dreams of Metaphysics* (1766; 2:315–384)
Jäsche	*Immanuel Kant's Logic* (ed. G.B. Jäsche) (1800; 9:1–150)

MFNS	*Metaphysical Foundations of Natural Science* (1786; 4:465–566)
ML₂	*Metaphysic L₂* (1780?; 28:531–640)
Mrongovius	*Metaphysic Mrongovius* (1782/3; 29:747–940)
NM	*Attempt to Introduce the Concept of Negative Magnitudes into Philosophy* (1763; 2:165–204)
OPA	*The Only Possible Argument in Support of a Demonstration of the Existence of God* (1763; 2:63–164)
Progress	*What Real Progress Has Metaphysics Made in Germany since the Time of Leibniz and Wolff?* (ca. 1793; 20:253–311)
Prolegomena	*Prolegomena to Any Future Metaphysics That Will Be Able to Come Forward as a Science* (1783; 4:253–384)
Refl.	*Reflections (Kants handschriftlicher Nachlaß*; Ak. 14–23; cited by four-digit number and volume and page number)
Vienna	*The Vienna Logic* (1780; 24:790–940)
WOT	*What Does it Mean to Orient Oneself in Thinking?* (1786; 8:133–146)

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Introduction

This thesis explores the notion of the systematicity of reason in Immanuel Kant's *Critique of Pure Reason* (1st edition 1781, 2nd edition 1787). Systematicity is a puzzling aspect of Kant's theoretical philosophy. Although presented as a key component of his critical system, Kant's treatment of systematicity in the *First Critique* is considerably underdeveloped if compared to other parts of his philosophy. In the *Prolegomena*, Kant describes it as an important "scholium" to his system whose details, however, have been only sketched in the *Critique* and should be further developed (*Prolegomena*, 4:364). After being neglected for a long time, this scholium has attracted ever more attention in the last decades and it is now discussed in a number of papers and publications from eminent scholars (Guyer 1990, Grier 2001, Geiger 2003, Allison 2004, Massimi and Breitenbach 2017, Willaschek 2018).

Despite such renewed interest, existing interpretations fail to offer a satisfactory account of Kant's notion of systematicity. Most commentators focus on particular aspects of it or discuss it in relation to more general problems. Other contributions look at the development of this notion in the *Critique of the Power of Judgment* to offer a more substantial view. For historical and interpretative reasons, I resist these impulses. The aim of my thesis is instead to provide a unified account of the systematicity of reason in direct continuity with main themes of the *Critique of Pure Reason.* This integrated approach within the *First Critique* will allow me to address different problems left unanswered in the literature (concerning unity of cognition, empirical truth, necessity of the laws of nature, transcendent metaphysics and empirical realism) as well as to fully evaluate the significance of systematicity in Kant's philosophical project.

I argue that reason's systematicity is not merely an afterthought or desideratum of our cognition, but rather a crucial feature of Kant's

philosophical project: it fundamentally complements the faculties of our mind in a variety of cognitive tasks. In particular, I defend the following claims: (a.) systematicity is grounded in a purposive and legitimate use of reason; (b.) it is necessary to make empirical cognition (i.e., cognition about sensible objects) possible and generate scientific hypothesis; and (c.) it gives us fundamental insights to understand key aspects of Kant's mature philosophical position, namely his 'empirical realism' and his understanding of metaphysics. In the course of the thesis, I not only reconstruct Kant's position on systematicity but also canvas ways in which it can apply more broadly to contemporary debates in philosophy of science. More specifically, I present it as a promising 'perspectival' (that is, epistemically situated) notion in the contemporary debate over unity and pluralism of scientific knowledge.

My thesis consists of five chapters divided into two parts. **Part I** reconstructs the legitimate use of the systematicity of reason within the framework of Kant's critical project. The aim of **Chapter 1**, "**A rule-based account of the regulative use of reason**," is to outline the general features of the regulative use of reason in Kant's Transcendental Dialectic, from its Introduction to the Appendix. Kant uses the term 'regulative' to refer to the critical and positive use of theoretical reason. Reason, for Kant, leads us to all sorts of unwarranted metaphysical claims about objects such as God, the soul, first causes, etc. If used regulatively, however, it has a fully legitimate place in cognition and is indeed necessary for investigating nature. The problem is that what Kant means by 'regulative' use of reason, why it is legitimate, and indeed necessary, are all extremely controversial questions. This chapter aims to shed light on these questions by proposing a rule-based account of reason and the use of its concepts (ideas). I contend that recent interpretations of reason do not sufficiently distinguish reason's regulative use from the use of reason that leads us to transcendent metaphysics, thus failing both to vindicate a fully legitimate use of it and to explain its compatibility with a necessary role in cognition. I advance a radical reading according to which Kant has not just dismissed or weakened the rational principles that lead us to transcendent metaphysics but given a new meaning

to them—as immanent (by no means empiricist) prescriptive rules. Such emphasis on the prescriptivity of theoretical reason allows us to clearly isolate its legitimate use and lay the groundwork for understanding its key role in Kant's view of scientific knowledge.

In **Chapter 2**, "**The idea of God and the empirical investigation of nature**," I analyse in detail the positive use of a particular idea of reason: the theological idea. In the Ideal of Pure Reason, Kant reconstructs the steps that lead human reason to postulate the idea of God—the most real being, or the *ens realissimum*. This idea plays a central role in Kant's negative critique of rationalist theology as the concept underlying the fallacious arguments for God's existence. This is not, however, the end of the story. Kant insists that the idea of God has also a positive role to play as a necessary regulative principle for the systematisation of empirical cognition. It is far from clear, however, whether Kant is thereby rehabilitating some aspects of the *ens realissimum* and, if this is the case, how this rehabilitation can be critically legitimate. I argue that that it is only by looking at the transcendental deduction of the ideas of reason (which Kant provides in the second part of the Appendix) that a fully legitimate positive use of the idea of God can be vindicated. In particular, I argue (i.) that ideas must be postulated as schemata rather than concepts of objects; and that (ii.) the content of ideas must be understood in analogical rather than descriptive terms. The proposed reading of the deduction provides us with a template for understanding the positive characterizations of the idea of God, including (but not limited to) its fundamental characterization as the *ens realissimum*.

Part II explains why the systematicity of reason has a necessary role in empirical and scientific cognition. **Chapter 3** "**Kant's space of reason and science: A perspectival reading**" shows how Kant's account of theoretical reason have implications for the contemporary debate over unity and pluralism of science. Although the unity of science thesis has been severely criticized in recent decades, I argue that pluralism as the sole epistemic principle guiding science is both too strong and too weak a principle. It is too strong because it does not account for the *process* of theory unification in

science (Newton's theory of motion, Maxwell's theory of electromagnetism, Einstein's special theory of relativity are all clear examples of brilliant unificatory achievements). It is too weak because it does not answer the question of how science ought to be done. I then look at a promising *perspectival* approach to the problem Kant presents in the Appendix. I argue that the logical principles of systematicity (homogeneity, specification, and continuity) form a 'perspectival space' within which scientists can pursue both unity and disunity of cognition. I explain how Kant's perspectivism can inform the current debate. I suggest that the conflict between pluralism and unity ultimately resides in a metaphysical characterization of unity that does not correctly capture its epistemic significance in science. Looking at Kant's perspectivism not only allows us to resolve this apparent antinomy, but also rethink unity and pluralism as mutually inclusive regulative principles.

In **Chapter 4**, "**The systematic unity of reason and empirical truth**," I attempt a reconstruction of reason's contribution to empirical truth in close connection with Kant's definition of truth as the agreement of cognition with its object. I argue that Kant's treatment of truth in the Transcendental Analytic is incomplete and gets completed by Kant himself in the Appendix to the Transcendental Dialectic with an often neglected but compelling argument (what I shall call the 'Variety Argument'). The latter argument postulates such a variety in the appearances that are given to us as to undermine any attempt at formulating empirical truths. Crucially, I argue that such variety does not depict an extreme-case scenario, but our own epistemic situation given the perspectival constraints of our knowledge. The systematicity of reason completes Kant's theory of truth as a necessary condition for the tenability of this theory at the empirical level. In particular, I show that the transcendental principles of reason Kant presents in the Appendix complement the understanding by providing two essential prerequisites of empirical truth: (i.) the possibility of formulating empirical concepts; and (ii.) the possibility of approximating to the agreement of empirical cognitions with objects. Such transcendental completion remarkably dovetails with the

empiricist account of concept formation and the other criteria of truth that can be found in Kant's corpus.

In **Chapter 5**, "**Empirical laws of nature and the role of reason**," I integrate a positive account of the role of reason and its ideas into the controversial debate regarding the necessity of empirical laws in Kant's philosophy of nature. After clarifying the modal problems involved in the transition from the transcendental to the empirical laws of nature, I critically discuss the three main interpretations of empirical laws of nature, namely 'Best system' interpretations, Friedman's account and the 'essentialist' account. I argue that none of these interpretations meets the requirement of assuring both the necessity of empirical laws and the possibility of acquiring insightful cognition of them. I therefore propose to complete the 'essentialist' account—what I take to be the best candidate for explaining the metaphysical grounding of the necessity of empirical laws—with Kant's doctrine of reason's systematicity and ideas. In particular, I show, first, that thinking real essences as ideas of reason provide us with epistemic access to 'comparatively inner' properties, i.e., properties that have ontological and epistemic priority over mere regularities. And second, that we can make sense of empirical progress in science only if we conceive of essences as unreachable totalities of empirical conditions rather than unknowable things in themselves. As a result, the proposed interpretation reconciles the epistemological and metaphysical side of empirical laws of nature and ensures the purposiveness of empirical enquiry.

Part I

1 A Rule-based Account of the Regulative Use of Reason

1. Introduction

The regulative use of reason has long attracted interest as a fascinating part of Kant's *Critique of Pure Reason*. Twentieth century philosophy was influenced by it and contemporary philosophers of science have been increasingly looking at it as a source of inspiration.[1] There's no denying, however, that this is also one of the most obscure parts of Kant's critical project and scholars disagree on many crucial aspects of it.

In the Transcendental Dialectic, Kant seems to use the term 'regulative' to refer to any critical and positive use of theoretical reason. His general point can be roughly summarized as follows. Reason leads us to all sorts of unwarranted metaphysical claims about objects such as God, the soul, first causes, etc. If it is used regulatively, however, reason has a fully legitimate place in cognition and is indeed necessary for investigating nature. Getting clear on such use therefore amounts to no less than understanding the critical fate of reason's drive towards metaphysics. The problem is that what Kant means by 'regulative use of reason,' why it is legitimate, and indeed necessary, are all extremely controversial questions.

This chapter aims to shed light on these questions by proposing a rule-based account of reason, its concepts (i.e., ideas) and the principles containing them. I contend that recent interpretations of reason do not sufficiently distinguish reason's regulative use from the use of reason that leads us to transcendent metaphysics, thus failing both to vindicate a fully legitimate use of it and to explain its necessary role in cognition. I will advance a radical reading according to which Kant has not just weakened the rational principles that lead us to transcendent metaphysics but given a

[1] For an analysis of the influence of the regulative use of reason on twentieth century philosophy, see French 1967. Among the several contributions inspired by the regulative use of reason in the philosophy of science literature, see Kitcher 1981, 1999; Morrison 2000, 2008; Breitenbach and Choi 2017; and Massimi 2017a, 2018, forthcoming.

new meaning to them—as immanent (by no means empiricist) prescriptive rules. Such emphasis on the prescriptivity of theoretical reason will allow to clearly isolate its legitimate use and lay the groundwork for understanding its key role in Kant's view of scientific knowledge.

The structure of the chapter is as follows. I will first introduce the terminology of the Dialectic, by focusing in particular on the meaning of 'unconditioned' and 'transcendental illusion' (Section 2). I will analyse the shortcomings of two influential accounts of the regulative use of reason (Sections 3 and 4) and identify their common problem (Section 5). I will then advance my rule-based account of reason by clarifying how Kant transforms reason's transcendent inclinations into immanent rules of inquiry (Section 6). Finally, I will explain why such interpretation of reason is metaphysically innocent (Section 7) and why it is a promising approach in order to vindicate reason's necessary role in science (Section 8).

2. Reason's transcendental illusion

Kant's main concern in the Dialectic is to curb the metaphysical pretensions of reason rather than isolate its positive use. For this reason, it is often assumed that Kant relegates such use to the Appendix as a mere afterthought to his *Critique*.[2] In this chapter, I will show that this assumption is wrong, and that Kant develops a coherent story from the first pages of the Dialectic to the second part of the Appendix. It is true, however, that this story is deeply embedded in Kant's critique of reason as the source of transcendent metaphysics. I therefore need to clarify some key aspects of such critique before moving on to the explanation of the regulative use of reason.

In Kant's system, reason is the higher faculty of cognition that demands the "unconditioned" for whatever "conditioned" it encounters (Bxx). Unfortunately, Kant does not precisely define the relation between a conditioned and its condition in the *Critique of Pure Reason*.[3] Much

[2] See, e.g., Kemp Smith 1962, Hortsmann 1989, Guyer 1990.
[3] The term 'unconditioned' appears in both prefaces (Axx, Bxx) and then in a few key passages of the Dialectic. Kant seems to take its meaning for granted.

interpretative work has been done to clarify its exact meaning.[4] I cannot survey the complexities of that literature here, but some clarifications are in order. By 'conditioning relation' Kant seems to refer to a wide range of relations between objects. Causality is a typical example of conditioning relations (a cause 'conditions' its effect), but also relations between substance and attributes, parts and whole, necessary and contingent, among several others, qualify as conditioning relations (see, e.g., Willaschek 2018, 74). We can regard them as objective relations of dependence or grounding (although it is debated whether they can be seen as species of a generic relation of metaphysical dependence, or rather they should be grouped into three classes according to the categories of relation).[5]

What does it mean that reason demands the 'unconditioned' then? Suppose we encounter something conditioned, for instance, something that is caused (an effect). We will look for its cause, but if we find the cause and it is still conditioned, reason will not rest content with it. It will demand to seek a further cause, and so forth, up to the 'unconditioned': a condition that is not itself conditioned (a first cause, for instance). In the *Critique of Pure Reason*, Kant often equates the demand for the 'unconditioned' with the demand for the 'totality of conditions.' This equation makes sense: when we look for the unconditioned, we look for everything that conditions a particular. In some cases, such totality corresponds to an unconditioned object that lies outside the empirical series of conditions (when, for example, we postulate a simple soul or a divine being; what Kant calls psychological and theological ideas). In the case of ideas that have to do only with appearances (cosmological ideas and, most clearly, what he calls "mathematical" cosmological ideas; A529/B557), however, the unconditioned corresponds to nothing but the totality of empirical conditions (the ideas of the totality of spatial parts or of past moments of the world, for instance).[6] In Kant's words, all reason

[4] See, in particular, Watkins 2016, 2019a; and Willaschek 2018, chapter 3.
[5] See Watkins 2016, 2019a for the first position; and Willaschek 2018, chapter 3 for the second one.
[6] See Allison 2004, 359–60. Although Kant applies this claim to all cosmological ideas, his later distinction between mathematical and dynamical cosmological ideas of reason makes an interpretation more difficult. In fact, the latter do involve non-sensible objects (A528–

demands is that the series of conditions is "complete" (e.g., A416/B444). This distinction will be helpful later on in our investigation but in the meantime, it suffices to point out that talk of the 'totality of conditions' allows Kant to extend the demand of reason to cases in which we are not apparently postulating any transcendent object.[7]

In the Dialectic, Kant argues that such demand of reason is bound to remain unsatisfied. It drives us beyond the boundaries of possible cognition, thus laying claims to unconditioned objects we cannot know (see Bxx). In spite of this, reason is ceaselessly misled into the illusion that the unconditioned can indeed be known by us. Kant calls this phenomenon 'transcendental illusion.' In the Introduction to the Dialectic, it is presented in the following terms:

> In our reason (considered subjectively as a human faculty of cognition) there lie fundamental rules and maxims for its use, which look entirely like objective principles, and through them it comes about that the subjective necessity of a certain connection of our concepts on behalf of the understanding is taken for an objective necessity, the determination of things in themselves. (A297/B353)

A transcendental illusion consists in taking "subjective principles" of our reason for an objective "determination of things in themselves." For Kant, this is not a mere mistake of reason or an "artificial illusion" we can simply avoid. Instead, it is a "*natural* and unavoidable *illusion*," that "cannot be avoided at all" and that "irremediably attaches to human reason" (A297–8/B353–4). Kant draws an interesting analogy with the case of the astronomer: the astronomer, he says, cannot "prevent the rising moon from appearing larger to him, even when he is not deceived by this illusion" (ibid.). Similarly, reason cannot avoid the illusion that its principles are passed off as determinations of how things really are.

32/B556–60). It is not clear to me whether Kant thinks that all cosmological ideas *can* be seen as concerning totality of empirical conditions or whether only mathematical ideas are to be seen as such. A detailed analysis of this problem goes beyond the scope of this work.

[7] In the *Progress* essay (1793), Kant may have changed his mind on this distinction and denied that a complete series of conditions is unconditioned (see *Progress*, 20:287). For analysis of such difficulties (which do not concern us here), see Willaschek 2018, 88–98.

It is important to note, as the example of the astronomer makes clear, that one is not necessarily deceived by the illusion. What is natural and unavoidable is the fact that rational subjective principles appear as objective, not our actual taking them as such.[8] In other words, for Kant, we have an inevitable tendency to make metaphysical claims about things in themselves on the basis of subjective rational principles, but we are not inevitably led to make those claims. Much of the Dialectic will be devoted exactly to this purpose: preventing the dialectical errors that lead reason to make unwarranted metaphysical claims. But Kant's treatment of reason does not stop with making reason's illusion harmless, so to speak. He goes on to argue that the very demand of reason that misleads us into all sorts of metaphysical fallacies and contradictions can be turned into a positive function. In Kant's words, a perfectly legitimate "immanent" use of reason is to be found (A643/B671): once prevented from deceiving, concepts of reason (ideas) have "an excellent and indispensably necessary regulative use" (A644/B672).

But what is the relation between transcendental illusion and the regulative use of reason? And how shall we interpret such positive use? I will present two influential proposals (what I shall call the illusory and the hypothetical accounts) and assess whether they successfully vindicate a use of reason that is legitimate and necessary to our empirical cognition. Despite their several merits, I will argue that they both fail to do so.

3. The illusory account of reason

The illusory account has been introduced by Michelle Grier and later followed by Henry Allison and several other interpreters.[9] Although divisive, it has gained the status of a quasi-standard reading of the positive use of reason in the Dialectic.[10] The main strategy of this account consists in vindicating transcendental illusion as itself legitimate and necessary to promote empirical cognition. Grier identifies transcendental illusion with the transition

[8] See, e.g., Grier 2001, 116.
[9] Grier 2001 and Allison 2004. See also Boehm 2012 and Walden 2019.
[10] For a critical view, see, e.g., McLaughlin 2014.

between a merely subjective law (reason's "logical maxim"—what she calls P1):

> **Logical Maxim (P1)**: "Find the unconditioned for conditioned cognitions of the understanding, with which its unity will be completed." (A307/B364)

and an objective principle (reason's "supreme principle"—P2):

> **Supreme Principle (P2)**: "When the conditioned is given, then so is the whole series of conditions subordinated to one another, which is itself unconditioned, also given (i.e., contained in the object and its connection)." (A308/B364)[11]

Note that these two principles differ not only with respect to their field of application (cognitions in P1 vs. objects in P2), but also in terms of their status. The Logical Maxim requires us to find unconditioned cognitions and is therefore a *prescriptive* principle. The Supreme Principle states that an unconditioned object is given and so is *descriptive* of a state of affairs. According to this reading, although the Supreme Principle is illusory in the sense that it involves a claim that goes beyond possible cognition, it remains a necessary assumption in our investigation of nature. As Grier puts it, the reason is that P2 is an "application condition" of P1, without which the prescription of reason would be a merely logical requirement with no real use (Grier 2001, 126).[12] Of course, the illusory reading does not license the Supreme Principle as the basis for metaphysical claims. P2 is an illusion that, although presented as objective, has no objective force in itself—it is only, as it were, an ideal of inquiry (see ibid., 285).

I find this account subtle and elegant. Is it, however, sufficient to avoid the metaphysical implications of transcendent metaphysics or, in Kant's words, prevent transcendental illusion from deceiving us? I do not believe this is the case for two reasons. First, because I think that it is questionable

[11] Passages quoted in Grier 2001, 119–25.
[12] Similarly, Allison 2004 argues that "according to Kant, P1 becomes itself a principle of reason precisely by assuming P2 which, as we have seen, he regards as obviously synthetic. This suggests that P2 serves as the application condition for P1 or, alternatively, that P1 and stand in a relation that is analogous to that between a category and its schema and in that sense are reciprocals" (330). In Boehm's words, P2 is "a necessary working assumption for everybody engaging in theoretical philosophy" (Boehm 2012, 314).

that a prescription based on an illusory metaphysical assumption is less metaphysically committed than one based on a genuine transcendent claim. Suppose that we can unify the inner appearances of our mind only by presupposing that something like a 'soul' (one of Kant's official unconditioned objects) is given. When taken in isolation, we can easily distinguish this illusory presupposition (P2) from the outright claim that the soul exists. However, the same distinction does not apply to the prescription resulting from presupposing P2. For such prescription ('unite inner appearances!') seems to be valid only if we take P2 as *true of objects*—in this case, if we presuppose that the soul is indeed given. But if this is correct, it is difficult to distinguish such commitment to P2 from the error of the transcendent metaphysician who takes claims that go beyond possible cognition to be truths about the world.[13]

One can here object that we do not necessarily need to take the illusory P2 as true in order for P1 to work as a prescription: the mere possibility that the unconditioned is given may suffice to ground the prescription to look for it. But even granting this, it is doubtful how such prescription can be, following Kraus, "binding at all" for us (Kraus 2020, 191). Since the illusory postulation of P2 can be blatantly false, it is unclear precisely why we *ought* to follow it in empirical investigation.[14]

Second, I do not think this account sufficiently recognizes the role of the distinction between appearances and things in themselves in Kant's Dialectic. While the prescriptive P1 is applied to objects given to us (appearances), the illusory P2 is formulated as a claim about things in themselves. This has the unfortunate implication that, when we base reason's prescriptions on P2, we are also treating appearances as things in

[13] See, for example, Grier 2001, 275: "this position, it seems to me, is tantamount to claiming that the regulative function of the principle of systematic unity is itself parasitic upon the transcendental and illusory postulation that nature, as an object of our knowledge, is already given as a complete whole"; see also ibid., 280. I am sympathetic with Willaschek's critique of what he calls the "identification reading" (between transcendental and constitutive principles of reason), although I offer a different explanation of such identification (cf. Willaschek 2018, 110–2).

[14] In other words, the illusory postulation of P2 fails to give us a reliable source of prescriptive rules; see also Kraus 2020, 190–3.

themselves.[15] Kant would be saying that in order to promote the empirical investigation of nature we need to commit ourselves to the illusory identification of appearances with things in themselves—an identification Kant famously rejects as transcendental realism (see, e.g., A491/B519). Not only does Kant not gesture towards such an illusory identification throughout the Dialectic, but he repeatedly argues, as we will see in detail, that distinguishing between appearances and things in themselves is crucial to understanding the correct use of reason.[16]

Such implicit metaphysical commitments can be further seen if we take a brief look at the role of reason in science resulting from this account. According to Grier, this role consists in the illusory "postulation of a non-sensible ground" of appearances (see Grier 2001, 300–1).[17] But using ideas as non-sensible grounds of appearances seems incompatible with Kant's repeated claims that ideas cannot be directly related to objects (see, e.g., A643/B671). When speaking about the correct interpretation of the ideal properties of the soul, Kant says:

> That simplicity of substance, etc., ought to be only the schema for this regulative principle, and *it is not presupposed as if it were the real ground of properties of the soul*. For these properties could rest on entirely different grounds, with which we are not acquainted at all, just as we might not really be able to cognize the soul at all through these assumed predicates even if we let them hold of it absolutely, since they constitute *a mere idea that cannot be represented in concreto at all*. (A683/B711; my emphases)

[15] See, e.g., Grier 2001, 277: "[P2] holds unconditionally of appearances as if they were things in themselves." From the fact that a principle is (hypothetically) true of things in themselves, it does not follow that it can be applied to appearances; see my discussion of the Supreme Principle of reason in Section 6.

[16] The fact that Kant in the Appendix says that "where reason itself is considered as the determining cause (in the case of freedom) […] we should proceed as if we did not have before us an object of sense but one of pure understanding" (A685/B713) is not evidence against my objection. For one thing, it is unclear how this 'as if' procedure could be extended to all other ideas that do not have the peculiar status of the idea of freedom. Second, Kant specifies that this procedure concerns "the case of practical principles" (ibid.) and, therefore, does not strictly belong in Kant's positive reading of speculative reason.

[17] Therefore, as things in themselves. See also McNulty 2015 for an interpretation of reason's ideas as the postulation of unconditioned grounds in chemistry.

I will clarify what Kant means by "schema" in this context later (see Sections 7 and 8). For the time being, I only want to point out that Kant clearly excludes that ideas (like "simplicity of substance") should be presupposed as if they were the real, transcendent grounds of properties of the soul.[18] To use ideas in such a way—whether "absolutely" or as an illusory "as if"—would mean to rely on them as some sort of representations of unknowable objects. On the contrary, ideas cannot be "represented *in concreto* at all": as we will see, the correct interpretation of the necessary role of reason in science requires a different approach to reason and its concepts.[19]

4. The hypothetical account of reason

The hypothetical account has been recently proposed by Marcus Willaschek (Willaschek 2018). This reading challenges the basic tenet of the illusory account, namely that there is something illusory about the regulative use of reason. According to this reading, no illusion is involved in positively using the principles of reason—these are mere hypotheses that do not commit us to any metaphysical claims. While the illusory reading assumes that the Supreme Principle is a necessary presupposition of reason, Willaschek distinguishes between a regulative and a constitutive use of the principle. The transition from the Logical Maxim to the Supreme Principle proceeds in two steps. The first step goes from the Logical Maxim to the regulative use of the Supreme Principle; the second step from the regulative use to the constitutive use of the Supreme Principle. Even though reason presumes that both steps are legitimate, only the first step is, whereas the second results from transcendental illusion.

What do these uses of the Supreme Principle consist in? The constitutive use of reason consists in taking the Supreme Principle as true of objects (see Willaschek 2018, 114). When used regulatively instead, the Supreme Principle is only hypothetically *descriptive* of objects: we

[18] See also A681/B709: "one mistakes the significance of the idea right away if one takes it to be the assertion, or *even only the presupposition*, of an actual thing" (my emphasis).
[19] For a different, but (I think) compatible objection, see Massimi 2017a, 67–71. Massimi argues that the role of reason in science resulting from this account "might at best be useful, instrumental, desirable; but not indispensable" (70).

"hypothetically employ [reason's principles] in order to generate hypotheses about objects of nature" (ibid., 116). Note the difference with the illusory account. According to the hypothetical reading, no commitment to the illusion that reason's principles determine things in themselves is necessary.[20] Principles of reason are, instead, merely neutral hypothetical claims. For instance, from the hypothetical assumption that there is homogeneity in nature, and the empirical findings that there are gold and silver, we can deduce the particular hypothesis that there is a genus encompassing them (i.e., noble metals; see ibid., 114).

I find many aspects of this reading convincing. It isolates a use of reason that is not dependent on illusory representations of things in themselves and, therefore, seems legitimate. Further, it dispenses from the need to read 'transcendental illusion' in a positive way—a term which has a clear negative connotation throughout the Dialectic (see, e.g., A504–5/B532–3; A695/B723).[21] Unfortunately, however, this reading also faces some textual and philosophical problems. In particular, Kant explicitly rejects the claim that concepts of reason can be used as hypotheses. In the Doctrine of Method, Kant defines hypotheses as opinions that, in order not to be "groundless," "must be connected as a ground of explanation with that which is actually given and consequently certain" (A770/B798). Concepts of reason cannot fall into this category for they "have no object in any sort of experience, but also do not on that account designate objects that are invented and at the same time assumed to be possible" (A771/B799). In short, since ideas are not connected with actual appearances nor can we demonstrate their possibility, to use them to explain "things in nature […] would be no explanation at all" (A772/B800).

But Kant's conception of hypotheses is perhaps too specific as it seems to presuppose that a hypothesis must be a direct explanation of appearances. After all, what the hypothetical account wants to say is that

[20] According to Willaschek 2018, this illusion is, instead, the starting point of any dialectical use of reason.

[21] There is only one passage in the entire Dialectic in which the term illusion ('*Illusion*') is given a clear positive meaning (A644/B672). But, as I will argue below, this *hapax legomenon*, as it were, can be explained without being identified with transcendental illusion.

principles of reason are neutral descriptive claims from which it is possible to derive particular explanations (e.g., that there is a genus that encompasses gold and silver). However, this response may still be insufficient to license a metaphysically innocent use of reason. For although we do not have to commit ourselves to the truth of such hypothetical principles, we would still be using them as descriptions that *can* be true of objects of experience. But how can we be warranted to do so? It is prima facie implausible that the unconditioned (a perfect homogeneity, a first cause, a simple soul, etc.) can ever be given to us in experience. Indeed, as we will see, Kant denies that the Supreme Principle can be applied to objects of experience at all.

One might further reply by distinguishing between the hypothetical truth-value of the principles of reason and what makes them true in experience. In other words, we may hypothetically assume principles of reason independently of the way we experience them. However, I do not find this reply entirely convincing since it implies that principles of reason concern nature as it is in itself, or things in themselves. As such, it would face similar challenges as the illusory account discussed above. How can we ground hypotheses about appearances in unverifiable principles that concern things in themselves? And since such principles can be blatantly false, how can they be prescriptively binding for us at all?

The outcome of this reading with respect to the “excellent use” of reason is quite different from that of the illusory reading, but similarly unsatisfactory. For given the commitment to the descriptivity of reason, a hypothetical reader needs to disregard all passages in the Appendix in which Kant claims that reason is not just a useful tool to formulate some additional hypotheses but is rather necessary for empirical cognition as such (e.g., A647/B675, A650–4/B678–82). Willaschek, for example, reads those passages as exemplary of transcendental realism (Willaschek 2018, 130, 146). But it would be peculiar that in key passages of a section called ‘On the Regulative Use of the Ideas of Pure Reason,’ Kant is impersonating the metaphysician rather than qualifying his own reading. Perhaps at the risk of simplifying too much, while the illusory account gives too strong a

rehabilitation of speculative reason, the one resulting from the hypothetical account comes out as too weak.

5. Preventing transcendental illusion from deceiving us

Despite the respective merits of the illusory and hypothetical accounts, there remains something unsatisfactory about these proposals. Neither account avoids being somewhat metaphysically committed nor fully vindicates the "excellent use" of reason. I think the problem they have in common lies in their commitment to the *descriptivity* of reason's principles. In this section, I will argue that as long as we rely on a descriptive relation to objects in order to positively use the ideas of reason, we cannot really prevent transcendental illusion from deceiving us.

If we want to prevent transcendental illusion from deceiving us, we need to correctly identify and remove the source of deception. On the illusory reading, it consists in avoiding metaphysical claims while taking advantage of the natural illusion of reason. On the hypothetical reading, it means suspending our judgment on the truth-value of reason's principles. Both strategies, however, do not meet Kant's more radical standard of reason's metaphysical innocence. For such innocence consists not just in qualifying the relation ideas have with objects—it consists in removing all direct reference to objects from our use of ideas.

That ideas cannot be legitimately taken to refer to any object is argued in several places of the Dialectic. Kant often repeats that ideas have no use *in concreto*, which just means that no object can ever correspond to them in experience (see, e.g., A323/B380, A327/B384). But without possible experience, "every concept is only an idea, *without truth and reference to an object*" (A489/B517; my emphasis) and any question about such possible reference is "entirely nugatory and empty" (A479/B507). Kant's reasoning is that since the unconditioned or totality of conditions thought in our ideas (a simple substance, the most real being, a perfect homogeneity, etc.) can never be given to us in possible experience, any attempt to regard them *as more than ideas* (namely, as concepts of objects) is improper and

misleading.[22] I will say more about Kant's argument for the claim that the unconditioned cannot be given to us in the next section. For the time being, it suffices to note that Kant clearly identifies such unwarranted relation between ideas and objects with the deception of transcendental illusion. At the beginning of the Appendix, Kant says:

> Everything grounded in the nature of our powers must be purposive and consistent with their correct use, if only we can guard against a certain misunderstanding and find out their proper direction. Thus (i.) *the transcendental ideas too will presumably have a good and consequently immanent use, even though,* (ii.) *if their significance is misunderstood and they are taken for concepts of real things, they can be transcendent in their application and for that very reason deceptive.* For in regard to the whole of possible experience, it is not the idea itself but only its use that can be either extravagant (transcendent) or indigenous (immanent), according to *whether one directs them straightway to a supposed object corresponding to them,* (iii.) *or only to the use of the understanding in general regarding the objects with which it has to do*. (A642–3/B670–1; my emphases)

I can isolate three main claims in this dense passage: (i.) that ideas are purposive and legitimate if correctly used; (ii.) that they are deceptive when directed to a supposed object corresponding to them; (iii.) that their immanent use consists in regulating the understanding. These three claims are very closely related, but for the moment let's focus our attention on the first two. Ideas are deceptive when taken as concepts of things because that would correspond to a misunderstanding of their "proper direction." If the relation to objects is the source of the deception, reason should be used in a way that does not rely on it. In other words, we do not just need to diagnose the deception, we also need to remove its source and use ideas in a radically different way. This is confirmed in the famous passage of ideas as *foci imaginarii* (vanishing points) that is generally taken to support the standard illusory interpretation. There Kant says that ideas have the indispensably necessary use of "directing the understanding to a certain goal" and make its concepts "converge at one point" (A644/B672). He continues:

[22] On this point, see also Willaschek 2018, chapter 9.

> Now of course it is from this that there arises the *deception*, *as if these lines of direction were shot out from an object lying outside the field of possible empirical cognition* (just as objects are seen behind the surface of a mirror); yet *this illusion (which can be prevented from deceiving)* is nevertheless indispensably necessary if besides the objects before our eyes we want to see those that lie far in the background, i.e., when, in our case, the understanding wants to go beyond every given experience (beyond this part of the whole of possible experience), and hence wants to take the measure of its greatest possible and uttermost extension. (Ibid.; my emphases)

From this passage, one may conclude that transcendental illusion is as *such* "indispensably necessary" to empirical investigation. But Kant's position is more subtle than this. He first confirms that metaphysical deception consists in relating an idea to an object and then refers to an illusion that is deprived of that very deception. As a result, the illusion Kant is referring to in this passage is, as it were, no longer illusory or deceitful—it consists instead in using ideas according to their proper use (what Kant generally calls the regulative use of reason).[23] In other places, Kant expresses the same point in a much clearer way. For example, Kant says that if we stick to the validity of the principle of reason as an immanent rule for the understanding, "the conflict of reason with itself will also be entirely at an end, since not only *will the illusion that put reason at odds with itself have been done away with through its critical dissolution*, but *in place of it*, that sense will have been uncovered in which reason agrees with itself, and whose misinterpretation was the sole cause of the conflict" (A516/B544; my emphases). Crucially, as this passage clarifies, the regulative use of reason does not merely rely on transcendental illusion but replaces it as a use of reason that fits the nature of its concepts.

[23] Strictly speaking, this is not an 'illusion' according to Kant's own definition: "one can place all illusion in the taking of a subjective condition of thinking for the *cognition of an object*" (A396; my emphasis). That the regulative use of reason is here called an "illusion" may be due to the fact that ideas act as 'vanishing points' for the understanding. Kant seems, therefore, to be using 'illusion' as a synonym for other expressions that appear in the Appendix, such as 'projection' or 'asymptote' (A647/B675; A663/B691). See my discussion of ideas as vanishing points in Chapter 3.

6. A rule-based account of the regulative use of reason

Preventing transcendental illusion from deceiving us does not simply consist in weakening the relation ideas have to objects—it consists in removing such relation from the proper use of reason, or any descriptivity attached to the regulative use of ideas. We still need to determine, however, what a non-descriptive use of reason amounts to. In what follows, I will advance a rule-based account of the regulative use of reason.

That ideas of reason are to be used as rules is not news in Kant's scholarship. Both Grier and Willaschek, for example, do maintain that reason has prescriptive force. But what is often overlooked is that Kant insists that ideas can *only* be valid as rules and that they can *only* prescribe the right direction to the understanding. Bennett calls a purely prescriptive account of ideas the "official doctrine about regulativeness" (Bennett 1974, 142). In his reconstruction, this doctrine is ultimately flawed and Kant himself fails to respect his own account (ibid., e.g., 143). The challenge for the reading I am proposing is therefore not so much to find textual evidence for it (which is overwhelming) but to show that Kant develops a coherent story. Taking my cue from other contributions that have emphasized the prescriptive role of reason (Massimi 2017a, forthcoming; Kraus 2018; and Walden 2019), I will present a unified account that will hopefully explain why the regulative use of reason is legitimate and why it has an excellent use in science.[24]

In particular, I submit that not enough attention has been given so far to a crucial aspect of the prescriptive role of reason: the fact that reason's prescriptions are not to be applied to things in themselves or appearances but to the *empirical* use of the understanding. By applying to such empirical use, as we will see, ideas can only be (indirectly) related to appearances. The limitation to appearances is a defining aspect of the positive use of reason that often goes unnoticed in the attempts to reconstruct this use. It is

[24] The "I-Rule" interpretation of ideas presented in Massimi 2017a, forthcoming, is a fascinating alternative to traditional accounts of transcendental illusion. Walden 2019 provides an interesting explanation of why the regulative use of reason is metaphysically innocent. However, they both rely on a positive reading of transcendental illusion. Kraus's 'prescriptive' analysis is limited to the case of the idea of the soul in psychology. My account greatly benefits from all these contributions.

no surprise that such reconstructions are often deemed as too 'metaphysical.' That such limitation is essential to vindicate a positive role for ideas is confirmed by the way Kant reformulates the Supreme Principle of reason in prescriptive terms in the Antinomies and subsequently deduces the peculiar objective validity of ideas in the Appendix.

6.1 The empirical synthesis requirement

Kant's most articulated discussion of how we should think the Supreme Principle of reason in prescriptive terms is found in section seven of the Antinomies chapter. Kant first clarifies why the Supreme Principle does not apply to appearances and then formulates its regulative version.

Kant starts the section with a variation on the Logical Maxim presented in the Introduction.[25] He confirms the prescriptive nature of this principle: if the conditioned is given, then "the regress in the series of all conditions for it is *given* to us *as a problem* (*uns*…*aufgegeben sei*)" (A498/B526). Kant adds that, since the concept of conditioned implies that something is related to a condition, this principle is "analytic and beyond any fear of a transcendental criticism" (ibid.). Things, however, are different when the principle is applied to objects. In this case, a distinction between things in themselves and appearances is in order. In the case of things in themselves, when the conditioned is given, the unconditioned is given as well. The reason being, roughly, that the understanding would represent things as they really are, so that our rational principles immediately apply to them.[26] The legitimate use of the understanding is, however, limited to appearances, to which the principle does *not* apply:

> For the *appearances*, in their apprehension, are themselves nothing other than an empirical synthesis (in space and time) and thus are given only *in this synthesis*. Now it does not follow at all that if the conditioned (in appearance) is given, then the synthesis constituting its empirical condition is thereby also given too and

[25] Here Kant calls it a "logical postulate of reason" (A498/B526).
[26] Kant's reasoning is clearly hypothetical: if we could know things in themselves (which we cannot), the Supreme Principle would be valid for them. For a detailed analysis, see Willaschek 2018, 152–4.

> presupposed; on the contrary, this synthesis takes place for the first time in the regress, and never without it. (A499/B527)

The inference to the unconditioned is blocked by the fact that appearances can only be given in the synthesis that happens in space and time. Let's call this condition the 'empirical synthesis requirement.' Given this requirement, "I can by no means infer the absolute totality of the series of conditions" (ibid.). But why is this the case? It is not clear whether Kant is denying the inference (i.) from the conditioned to its condition; or (ii.) from the conditioned to the totality of conditions. Both options are problematic, for they seem to commit Kant to some form of extreme idealism.

As concerns (i.) above, one may take Kant to be saying, in a Berkelian fashion, that a condition does not exist unless it is actually perceived. This would go against what Kant himself argues in other parts of the *Critique*, namely that the existence of something only requires a connection to actual perception (A225–6/B272–3).[27] But it is plausible to think that all Kant wants to say is that without an empirical synthesis, we are not entitled to judge that a condition is given. In other words, he is merely rehashing his view that a judgment about experience is synthetic. Note that such synthesis needs not be an actual perception. In several passages of the Dialectic, Kant admits a variety of indirect ways to carry the synthesis and assure a connection with actual perceptions (e.g., "the guiding thread of history, or the chain of effects and their causes" (A521–2/B549–50; see also A527/B555).

If this is correct, what Kant is plausibly denying is the inference from a given conditioned to the totality of its conditions (ii.). Given the empirical synthesis requirement, no inference to the totality of conditions is possible. He elaborates on this point multiple times by arguing that appearances and the totality of conditions are contradictory with each other. Our experience is always conditioned in space and time so that "you always remain caught up among *conditions* […] and you never get to the unconditioned" (A483/B511).

[27] See Willaschek 2018, 155.

But here again, commentators have noticed a threat of "extreme idealism."[28] The problem would be the following: from the fact that we cannot experience the totality of conditions, it does not follow that such totality does not exist.[29]

It is important to note, first, that such objection would only apply to a specific type of ideas. With respect to ideas that postulate transcendent objects (e.g., psychological and theological ideas), Kant's claim is much more modest. As we have seen, he argues that the Supreme Principle is false of appearances, but not of things in themselves. In several places, Kant points out that, although the objects of such ideas remain completely unknown to us, it would be presumptuous of us to deny their possibility "on the basis of any supposedly better insight" (A772/B800; see also A478/B506).

The objection may instead apply where the totality of conditions corresponds to nothing more that the complete series of empirical conditions (for example, the cosmological ideas of complete composition, partition, etc.). In this case, it seems prima facie less plausible to deny the 'existence' of a complete series because we cannot experience it. Although I cannot here analyse the difficulties of the Antinomies, I think Kant's position coherently follows from his commitment to the distinction between appearances and things in themselves (key to his transcendental idealism) rather than from some form of 'extreme idealism.' In the case of ideas that concern complete series of conditions, we are only dealing with conditions that can be given in space and time, namely appearances (see A479/B507). But, for Kant, series of appearances cannot exist in themselves but only in the synthesis through which we experience them: "they exist only in the dynamical regress" (A506/B534). To say that series of appearances exist, or may exist, independently of such synthesis would be to take them *as things in*

[28] This objection goes back to Bennett 1974, 126, and Guyer 1987, 404–6; it has been recently raised again by Willaschek 2018, 155.

[29] Guyer, for instance, argues that Kant makes an illicit "transition" from an epistemological to an ontological argument (Guyer 1987, 404–5). At one place, according to Guyer, Kant would even "sound like Schopenhauer" by claiming that "our object is in our brain" (ibid.). Note, however, that the object Kant is referring to there is not the empirical object but the object in the idea (cf. A484/B512)!

themselves. In other words, Kant is merely denying the existence *in itself* of a series of empirical conditions. And he is allowed to do so on the basis of the key distinction of transcendental idealism, namely the distinction between appearances and things in themselves. As a result, I believe that Kant's argument does not commit him to any 'more extreme' version of idealism than his transcendental idealism.[30]

6.2 A new meaning for the Supreme Principle of Reason

The outcome of Kant's critique of speculative reason, however, is not just denying the validity of the Supreme Principle for appearances. Rather, Kant devises a new meaning for it—he elaborates a regulative version of the Supreme Principle (what I shall call the Regulative Supreme Principle). This version says that: "a *regress* to the conditions, i.e., a continued empirical synthesis on this side is demanded or *given as a problem* (*aufgegeben*), and that there could not fail to be conditions given through this regress" (A499/B527). Perhaps even more clearly, Kant says a few pages later:

> **Regulative Supreme Principle (RSP)**: "The principle of pure reason we are thinking of retains its genuine validity only in a corrected significance (*Bedeutung*): not indeed as an *axiom* for thinking the totality in the object as real, but as a *problem* (*Problem*) for the understanding, thus *for the subject in initiating and continuing, in accordance with the completeness of the idea, the regress in the series of conditions for a given conditioned.*" (A508/B536; my emphasis)

The "significance" of the principle has now been "corrected." For the metaphysician, the totality of conditions is given as an object. For the critical philosopher, such totality is only given as a "problem for the understanding." The difference between these two meanings of 'given' is often underappreciated. Kant is not saying that the totality of conditions is now given as an illusion or a mere hypothesis. Much more radically, the Supreme Principle is now turned into a *prescriptive* demand that regulates nothing but

[30] Of course, one may further argue that Kant's transcendental idealism *is* a form of 'extreme idealism,' but that would be a very different type of objection. As such, I cannot discuss it in this chapter.

our own empirical synthesis. Namely, reason demands the subject to "initiate and continue" the empirical synthesis in accordance with her ideas.

Let's specify the status of this principle before giving more details on Kant's account of the regulative use of reason. First, one may be tempted to equate this principle with the equally prescriptive Logical Maxim and regard it as an analytic principle. Note, however, that RSP does not apply to abstract concepts, but to the empirical use of the understanding (the use of the concepts of the understanding in relation to objects of experience). Since it requires of us new acts of synthesis, this principle cannot be analytic, but synthetic (see A663/B691). Second, although it applies to the empirical use of the understanding, RSP cannot be a posteriori, for it demands a complete synthesis independently of and prior to any empirical content. It is rather an a priori principle according to which we "initiate and continue" the synthesis of any empirical content (see, e.g., ibid. and A527/B555).

Despite its being synthetic and a priori, one may still question the utility of RSP. Bennett, for example, has argued that reason is not really playing any role here and that Kant is just playing what he calls a "futurizing move" (namely, projecting the empirical synthesis into the future; Bennett 1974, 124–6). Such projection can be explained with no help from reason. Bennett's reading, however, neglects the significance of the prescriptive nature of the principle of reason. It is true that reason does not ask the understanding to do anything more than what it can 'normally' do—this, as we will see, is precisely the reason why such use of reason is fully legitimate. But reason prescribes that something we do (the empirical synthesis of the understanding) *ought* to be done.[31] By contrast with the understanding, which is only concerned with given conditions, reason (and only reason) demands the unconditioned totality. Early on in the Dialectic, Kant calls this function the "unity of reason":

> If the understanding may be a faculty of unity of appearances by means of rules, then reason is the faculty of the unity of the rules of understanding under principles. Thus it never applies directly to experience or to any object, but instead applies to

[31] I here concur with Guyer 1990, 21.

> the understanding, in order to give unity a priori through concepts to the understanding's manifold cognitions, which may be called '*the unity of reason*,' and is *of an altogether different kind than any unity that can be achieved by the understanding*. (A302/B359; my emphases)

Reason never applies to any object, but only gives a priori unity of the understanding—a unity the understanding could not by itself achieve. This makes sense. We do not normally look for the totality of conditions. We rest content with immediate empirical conditioning relations (cause and effect, parts and whole, subject and predicates, etc.), but any attempt to *cognize* such empirical relations requires something more of us—namely, "a *rule*, prescribing a regress in the series of conditions for given appearances, in which regress it is never allowed to stop with an absolutely unconditioned" (A508–9/B536–7).

This rule-based interpretation of the principle of reason (and its concepts) is echoed throughout the Dialectic. In the first book of the Dialectic, Kant repeatedly calls ideas "problems":

> Hence the pure rational concepts of the totality in a synthesis of conditions are necessary at least as *problems of extending the unity of the understanding*, if possible, to the unconditioned, and they are grounded in the nature of human reason, even if these transcendental concepts lack a suitable use *in concreto* and *have no other utility than to point the understanding in the right direction* so that it may be thoroughly consistent with itself when it extends itself to its uttermost extremes. (A323/B380; my emphases)

Note that the only function of the concepts of reason as problems is "to point the understanding in the right direction." These concepts do not just ground hypotheses that may be true of nature—they are radically problematic, or problems with no possible solution. As Kant points out, the "absolute whole of appearances *is only* an *idea*, since, because we can never project it in an image, it remains a *problem* (*Problem*) without any solution" (A328/B385). The fact that they are only ideas, however, by no means undermines their significance. Not only have they a fundamental role in grounding practical philosophy, but they are also central in speculative philosophy:

> Although we have to say of the transcendental concepts of reason: *They are only ideas*, we will by no means regard them as superfluous and nugatory. For even if no object can be determined through them, they can still, *in a fundamental and unnoticed way*, serve the understanding as a canon for its extended and self-consistent use, through which it cognizes no more objects than it would cognize through its concepts, yet in this cognition it will be guided better and further. (A329/B387; my emphasis).

In the next sections, I will try to determine such "fundamental and unnoticed way" more thoroughly. Before turning to that, let me highlight the importance the empirical synthesis requirement has to RSP. It has been recently argued that the reason why we cannot attain a complete totality of conditions is the unbound nature of reason (cf. Walden 2019). Namely, the fact that every act of completion requires a further act of reflection, so that reason engages itself in an indefinite work (see ibid., 584). While unboundedness is definitely a crucial characteristic of reason, I think it explains why we come up with the idea of the unconditioned (namely, by asking for ever more remote conditions) rather than why such unconditioned cannot be attained. The cause behind this impossibility is, instead, that our theoretical reason is limited in its cognition. The point is not that reason is unbound or iterative, which it is, but that it is limited no matter how many times it is iterated. Such iteration always occurs in space and in time, so that we can never exhibit an absolute object or whole of conditions. To say that a totality of conditions can be given to us, as transcendent metaphysicians do, would mean to depart from the boundedness of the human perspective.[32] But this very limitation to the realm of sense is also what transforms a metaphysical doctrine into a necessary rule that expands the limits of our inquiry beyond what is immediately given to us.

7. Orienting the empirical use of the understanding

As introduced in the previous section, ideas must be conceived as rules for the understanding. Inasmuch as a rule-based account of reason does not

[32] For an exploration of this thought and an interpretation of the Dialectic as an 'experiment' to exit the human perspective, see Zuckert 2020.

attribute ‘corresponding objects’ to ideas, it is able to avoid the transcendent commitments of descriptive interpretations of reason’s regulative use. It is still not entirely clear, however, what rules of reason amount to. Clarifying this point is of the utmost importance in order to get a sense of why Kant deems the regulative use of reason legitimate and metaphysically innocent. For the fact that theoretical reason is fundamentally prescriptive rather than descriptive is not by itself a guarantee that it is not metaphysically committed. If reason prescribed a despotic or arbitrary rule, for instance, we would not be better off following it. Therefore, we need to determine more precisely what kind of rule it prescribes and how it avoids the threat of being committed to transcendent metaphysics.

The threat of transcendent metaphysics comes in two forms. The first stems from the *object* to which the prescription applies. The second from the *content* of the prescription. Let’s start with the first one. If the object of the prescription were nature itself, reason would unilaterally impose its rules to it. For example, reason would prescribe that nature is perfectly homogeneous, or that it is systematically organized. Now, we have seen at length that the object of reason’s rules is not nature, but the understanding. Is this, however, sufficient to avoid an arbitrary kind of prescriptivity? After all, according to Kant, the understanding does prescribe its laws to nature, so why would reason’s rules not impose anything on nature via the understanding?[33]

To answer this question, we need to clarify in what sense the understanding is the object of the rules of reason. A rule of reason, as Kant says, only “postulates what should be effected by us in the regress but *does not anticipate* what is given in itself *in the object* prior to the regress” (A509/B537). Similarly, the rule “cannot say *what the object is*, but only *how the empirical regress is to be instituted* so as to attain to the complete concept of the object” (A510/B538). I take Kant to mean that rules of reason do not impose a particular image of nature for the understanding to realize. Rather, their only function is to guide and assess the empirical use of the

[33] See Massimi 2014 and Watkins 2019b for analyses of Kant’s governing conception of laws of nature.

understanding itself. In other words, we should think about reason's ideas as *meta-rules* of empirical investigation.

Kant fleshes out this thought in the first part of the Appendix. Since the understanding is the proper object of reason, Kant says, its business is nothing but "to make systematic the unity of all possible empirical *actions* of the understanding" (A664/B692; my emphasis). A rule of reason accomplishes this task by acting as an "*analogue* of a schema" (A665/B693). As schemata of sensibility allow the understanding to unify appearances, ideas systematize the actions of the understanding by demanding the "*maximum* of division and unification of the understanding's cognition in one principle" (A665/B693). They are second-order schemata, or meta-rules, whose only function is to maximize the unity and extension of our empirical inquiry.[34] In fact, ideas as schemata are very different from those of sensibility. In that case, the application of the categories to their schemata results in a cognition of the object. To use one famous Kantian example, the concept of 'dog' is connected to a general schema of a four-footed animal that we can recognize in several concrete representations (A141/B180). But in the case of ideas, no representation can ever correspond to them—e.g., I can never say '*this* is a simple soul,' or '*this* is a perfect homogeneity.' Ideas are schemata only inasmuch as they guide our investigations—for example, by telling us to maximize our empirical regress with respect to the unity of inner appearances or to the homogeneity of nature.

The second-order validity of rules of reason is still insufficient to address our second worry, namely the one concerning the content of the prescription. For even granting that prescriptive rules are to be conceived as meta-rules of inquiry, they could still prescribe determinate kinds of empirical regress or synthesis. Kant opposes this thought in several places by highlighting that rules of reason have only indeterminate value (e.g.,

[34] I therefore disagree with Guyer's stark distinction between a "quantitative" and "qualitative" version of regulativeness (Guyer 1990, 20–3). Both versions can be regarded as ways to maximize our empirical research (and ways to proceed to more remote 'conditions,' see section 2). Indeed, ideas perform the same task differently: psychological and theological ideas promote forms of maximal unity of our investigation, whereas cosmological ideas promote forms of maximal extension.

A518/B546, A693/B721). Consider a rule that tells us to continue our empirical regress in a certain kind of appearances. Kant offers the following examples: “that from a living human being one must always ascend in the series of his ancestors without ever expecting a first pair, or in a series of bodies in the world without admitting an outermost sun” (A522/B550). Although these rules apply to our synthesis and seem therefore legitimate, they are not entirely metaphysically uncommitted. For they still demand us to always expect something particular in our regress (“new ancestors” or “series of bodies”), thus predetermining our empirical findings. What a rule of reason prescribes, instead, is “only the progress *from appearances to appearances*, even if they should yield no actual perception” (ibid.; my emphasis). In other words, a rational rule gives us no clue as to what kind of appearances we will encounter in our empirical synthesis. This is because the content of ideas provides us with specific instructions on how we ought to unify the cognitions of the understanding, but it does not tell us how such unity will be realized (see A661/B689).[35] The latter is precisely the task of the empirical investigation—reason initiates and regulates such investigation, but never predetermines it.

To summarize these points, rules of reason are to be regarded as meta-rules of bottom-up empirical research. They are legitimate because they do not impose a top-down approach to nature but set the limits and conditions within which empirical research ought to be carried out. In particular, they do not promote a particular image of nature nor they predetermine the kind of regress we are going to find in it. Rather, they tell us to always proceed from a conditioned to its condition and never take the empirical synthesis as complete. In other words, their function is to guide the way we direct our investigation in the world. As Kant often emphasizes, the function of reason is essentially *orientational*. Ideas are defined as *foci imaginarii* (vanishing points) that direct the understanding (A644/B672), they

[35] According to Walden 2019, the reason why regulative principles are metaphysically innocent is that the content of ideas is inherently indeterminate. I think, instead, that we need to distinguish between the content of ideas as objects and their prescriptive content as rules. As objects, ideas are indeed completely indeterminate. As rules, however, their content can be “determinately kept in mind” as specific maxims of investigation (see A665/B693).

give us a "general indication (*allgemeine Anzeige*)" of inquiry (A661/B689), they "point the understanding in the right direction (*in die Richtung zu bringen*)" (A323/B380), and they "only point the way toward systematic unity (*zur systematischen Einheit den Weg vorzuzeichnen*)" (A668/B696). This function of reason closely ties in with our being finite cognitive agents. Since our cognition is limited by the bounds of sense, reason cannot satisfy its demand. When limited by the bounds of sense, however, such demand does not merely 'disappear'—it disposes of its groundless cognitive pretensions and becomes, to use a term Kant elsewhere uses, a "*drive* for cognition" that allows the subject to advance in its empirical investigations (*WOT*, 8:140; my emphasis).[36]

8. The excellent use of reason: toward systematic unity

As I have argued in Sections 3 and 4, descriptive interpretations of reason have the unfortunate result of not properly vindicating the regulative use of reason in science as "excellent" and "indispensably necessary." Does a rule-based account of reason fare better than previous reappraisals of reason? One may suspect that a purely prescriptive interpretation, while being metaphysically innocent, runs the risk of leaving us empty-handed. I will argue that this is not the case and that a purely prescriptive reason does the work required to orient the understanding with respect to appearances.

The main problem of a prescriptive account of reason is that it does not seem able to account for the objectivity that Kant attaches to ideas of reason. Kant insists that the principles of reason have some kind of "indirect" and "indeterminate objective validity" (A665–6/B693–4; A669–70/B697–8).[37] How can we explain such validity from a prescriptive point of view? The only proper object of reason is the understanding. This limitation, however, does

[36] Kant elaborates on such orientational connotations of reason in *What Does it Mean to Orient Oneself in Thinking?* (1786). For a more detailed analysis, see Ypi 2017.
[37] Cf. O'Shea 1997 and Watkins 2019b. Watkins, for example, takes the fact that ideas have some objective validity as an indication that they are "ontological principles" that do not "determine the world" (218). But note, following Gava (forthcoming), that by qualifying an ontological principle as 'indeterminate' (by saying, for example, that the world *is* a systematic unity, albeit only indeterminately so) we would still be attributing an illicit constitutive force to reason.

not preclude reason from having some *indirect* reference to objects. As we have seen, ideas are second-order schemata that apply to the understanding a priori. But Kant also adds:

> Now since every principle that establishes for the understanding a thoroughgoing unity of its use a priori is also valid, albeit only indirectly, for the object of experience, the principles of pure reason will also have objective reality in regard to this object, yet not so as to *determine* something in it, but only to indicate the procedure in accordance with which the empirical and determinate use of the understanding in experience can be brought into thoroughgoing agreement with itself, by bringing it *as far as possible* into connection with the principle of thoroughgoing unity; and from that it is derived. (A665–6/B693–4)

The objective reality Kant attaches to ideas is spelled out in prescriptive terms. Ideas do not determine objects, nor do they do so fictionally or hypothetically. What they do is indicate the "procedure" according to which the empirical use of the understanding is made consistent with itself. That is how ideas are granted some form of "reality." But what does this mean? Kant further elaborates on the meaning of such procedure in the second part of the Appendix, where he gives the 'official' deduction of the ideas of reason. He says:

> It makes a big difference whether something is given to my reason as *an object absolutely* or is given only as an *object in the idea*. In the first case my concepts go as far as determining the object; but in the second, there is really only a schema for which no object is given, not even hypothetically, but which serves only to represent other objects to us, in accordance with their systematic unity, by means of the relation to this idea, hence to represent these objects indirectly. (A670/B698)

In this dense passage, Kant explains that ideas do not have reality inasmuch as they directly represent actual or hypothetical objects. Rather, their reality consists in the function they afford. In particular, they allow the progressive systematization of objects of experience. They do so precisely as rules for the empirical use of the understanding—as Kant puts it, they show how "we ought to *seek after* the constitution and connection of objects of experience

in general" (A671/B699).[38] Think about the idea of the soul. It might be tempting to interpret the regulative use of such an idea as the presupposition of a transcendent ground of appearances (cf. the illusory account in section 3). But that would be a mistake for we are not warranted to introduce "mere thought-entities" just for our own benefit (A673/B701). The concept of the soul (namely, of a simple, unchangeable, intelligent substance) is rather a rational rule or, as Kant also puts it, a "standard" that tells us how we ought to investigate inner appearances (A675/B703)—for instance, that we ought to regard all powers of our mind as derived from one fundamental power, or all changes as belonging to a substance (A682–3/B710–11).[39]

But if we are not allowed to use concepts that go beyond experience to determine objects, why can we still use them to guide experience? Kant's answer is that concepts of reason, if used as mere rules, are *not really* transcendent concepts. They "should be grounded only as analogues of real things, but not as things in themselves" (A674/B702). Ideas as rules are therefore what Kant more generally calls "philosophical analogies":

> In philosophy, however, analogy is not the identity of two quantitative but of two qualitative relations, where from three given members I can cognize and give a priori only the relation to a fourth member but not this fourth member itself. (A180–1/B222–3)

As philosophical analogies, ideas only give us a "relation" to something that remains completely unknown to us (or simply unattainable, in the case of complete series of empirical conditions)—a relation that is, however, necessary in order to systematize appearances. Take again the concept of soul. By means of experience, we cannot systematize the appearances of inner sense for we only encounter a manifold of particular and unrelated representations (see Kraus 2018, 81–2). Reason thus introduces the concept of the soul in order to think the relation between inner appearances and their

[38] I discuss in detail the deduction of the ideas of reason in Chapter 2.
[39] For a detailed analysis of the role of the idea of the soul, see Kraus 2018. According to Kraus, the idea of the soul has two essential functions: it delineates the domain of psychology and allows the systematization of its laws.

unknown ground as systematic. By thinking such relation as systematic, however, reason does not attempt to describe a transcendent object (what the soul really or hypothetically is) but prescribes the understanding to look for more remote empirical conditions for the given conditioned inner appearances. In other words, substantial unity, fundamental powers, unchangeability are the rules that allow us to "initiate and continue" the empirical regress with respect to inner appearances, thus delineating the domain of psychology (A508/B536). Kant's point is again that reason's only validity and function is to regulate the empirical use of the understanding.

If this is correct, there is really no contradiction between the rule-based account I have proposed and the objectivity of the rules of reason. Rather, such "indirect" and "indeterminate" objectivity immediately attaches to any prescriptive rule reason gives us. Without determining anything, reason guides the way the understanding *relates* to the world. This, I submit, is the "fundamental and unnoticed way" in which speculative reason, as Kant says in the first book of the Dialectic, serves the understanding (A329/B387).[40] Reason does not merely help the understanding formulate additional hypotheses that complete a system of cognitions already given to us (cf. the hypothetical account in section 4). Much more radically, it makes possible any coherent use of the understanding that goes beyond a mere production of given experience. In other words, reason is a necessary ingredient of any empirical cognition that is not a mere aggregate of particular and unrelated cognitions.

Kant identifies the necessary contribution of reason to empirical cognition with *systematic unity*. As Kant puts it in the Appendix, "the systematic in cognition" is "what reason quite uniquely prescribes and seeks to bring about" (A645/B673) and similarly that "the unity of reason is the unity of a system" (A680/B708). Such unity, that, as we have seen, reason attempts to realize through ideas as rules, is of great significance for any scientific consideration of the world. In the Architectonic of Pure Reason,

[40] See Massimi 2017a, forthcoming, for an interpretation of the coherent use of the understanding that emphasizes the role of ideas in making what she calls "inter-conversational agreement" possible.

Kant says that “systematic unity is that which first makes ordinary cognition into science, i.e., makes a system out of a mere aggregate of it” (A832/B860). It follows that science is made possible by the faculty of reason and its demand for systematic unity (or, ‘systematicity’). In other words, empirical cognition can aspire to be scientific only if it is rationally transformed into a system. To unpack what ‘systematicity’ amounts to would require considerable interpretative work that cannot be undertaken in this chapter. However, I believe that vindicating reason’s prescriptive role is the necessary preliminary groundwork of any promising investigation into the relation between reason and scientific knowledge.

9. Conclusion

In this chapter, I have advanced a rule-based account of the regulative use of reason that helps us understand why Kant deems such use critically legitimate and necessary for promoting empirical cognition. If my reading is correct, in the *Critique of Pure Reason* Kant does not merely qualify the metaphysical inclinations of reason that characterize transcendent metaphysics. Rather, he deeply rethinks the rational sources of our mind in prescriptive terms. The critical fate of transcendent metaphysics consists in its radical transformation into an immanent endeavour to systematize the empirical world. Such endeavour is not just an additional desideratum of cognition, but fundamentally orients the understanding within the world and beyond what is partially and chaotically given to us in experience. Finally, although Kant’s story clearly relies on several assumptions of his philosophy, it does not necessarily commit us to an extreme form of idealism and teaches us a deep lesson about the prescriptivity of human reason in the theoretical realm.

2 The Idea of God and the Empirical Investigation of Nature

1. Introduction

In Section Two of the Ideal of Pure Reason (The Transcendental Ideal), Kant reconstructs the steps that lead human reason to postulate the idea of the most real being, or the *ens realissimum*. This idea plays a central role in Kant's negative critique of rationalist theology. For Kant, the *ens realissimum* is the philosophical basis of the idea of God and the concept underlying the traditional arguments for God's existence.[1] As is well known, Kant argues that the Ontological, Cosmological, and Physico-theological arguments are fallacious and that we cannot theoretically demonstrate the existence of God. This is not, however, the end of the story. Kant insists that the idea of God has also a positive role to play, not only in the practical, but also in the theoretical realm. In particular, the idea of God is presented as a necessary regulative principle for the systematization of empirical cognition. Indeed, as Kant argues in the second part of the Appendix to the Transcendental Dialectic, we "must presuppose" this idea "in relation to the systematic and purposive order of the world's structure (*in Beziehung auf die systematische und zweckmäßige Ordnung des Weltbaues*)" (A698/B726).

It is far from clear, however, whether Kant is thereby rehabilitating some aspects of the *ens realissimum* and, if this is the case, how this rehabilitation can be critically legitimate. The literature has been divided on this issue. As noted by Wood, the rationalist background of the arguments Kant presents in the Transcendental Ideal has made it not particularly appreciated among his readers, particularly his English-speaking ones (Wood 1978, 27). Kemp Smith, Strawson, and Bennett, for example, all consider Kant's derivation of the *ens realissimum* at odds with the critical

[1] See, e.g., Allison 2004, 396.

project.[2] After Wood's ground-breaking study (Wood 1978), however, several attempts at critically interpreting the ideal in positive terms have been made (for example, Grier 2001, Allison 2004, Longuenesse 2005). In this chapter, I will argue that such attempts are promising and grounded in the text, but they all miss what I take to be the essential element that explains the critical legitimacy of the *ens realissimum*. This element is the transcendental deduction of the idea of reason Kant provides in the second part of the Appendix to the Transcendental Dialectic.

The transcendental deduction of the ideas has not been particularly studied in the literature—nor has it been discussed in relation to the transcendental ideal.[3] This is an unfortunate gap in the literature since the deduction is supposed to explain how the ideas of reason, including the idea of God, can obtain objective validity and become critically legitimate with respect to the systematization of empirical cognition. In this chapter, I will show that the second part of the Appendix gives us precise instructions on how to critically understand the postulation of the idea of God and its role in the investigation of nature. In particular, I will argue (i.) that ideas must be postulated as *schemata* rather than concepts of objects; and that (ii.) the content of ideas must be understood in *analogical* rather than descriptive terms. The proposed reading of the deduction will provide a template for understanding the positive characterizations of the idea of God, including (but not limited to) its fundamental characterization as the *ens realissimum*.

The plan of the chapter is as follows. I will first reconstruct Kant's derivation of the transcendental ideal in the Ideal of Pure Reason and discuss its critical legitimacy (Section 2). I will then take a close look at the transcendental deduction of ideas in the second part of the Appendix (Section 3). In Section 4, I will apply the deduction to the derivation of the ideal of pure reason and derive its critical version. Finally, I will conclude by

[2] See Kemp Smith 1918, 522; Strawson 1966, 222; Bennett 1974, 282.
[3] Even discussants of the positive role of reason tend to focus primarily on the first part of the Appendix. Cf., e.g., Guyer 1990, Neiman 1994, Grier 2001, Geiger 2003, and Willaschek 2018.

briefly discussing other positive characterizations of the idea of God (Section 5).

2. The transcendental ideal: the argument and its critical legitimacy

2.1 Reconstruction of the argument

In the first section of the Ideal of Pure Reason (The Ideal in general), Kant introduces the general notion of ideal and distinguishes it from both categories and ideas on the basis of their 'distances,' as it were, from "objective reality." Objective reality, according to Kant, is a property that representations have when they are "related to an object" and "have significance and sense ("*Bedeutung und Sinn*") in that object" (A155/B194).[4] Categories are mere forms of thought, but they can obtain objective reality when related to appearances through transcendental schemata. Ideas are "more remote" from objective reality because no empirical representations can be found that correspond to them (A567/B595). Indeed, ideas are presented as "transcendent concepts": concepts that go beyond possible experience (see A320/B377 and A327/B384). Since, for Kant, knowledge of objects is limited to possible experience, it seems to follow that ideas cannot obtain objective reality from a theoretical point of view.[5] They still maintain some validity and an indispensable function though: namely, that of serving as "rules" for the systematic unity of cognition (A568/B596).

An ideal seems even "further removed" from objective reality than an idea. Kant uses the term ideal in the specific sense of indicating an idea "*in individuo*, i.e., an individual thing which is determinable, or even determined, through the idea alone" (ibid.). Whilst a mere idea is a general concept, the ideal is a fully determinable, or determined, representation of an individual being. To this specific definition corresponds a particular function. If ideas give us general "*rules*" for the systematic unity of empirical cognition, the

[4] See "*objektive Realität*" in the *Kant-Lexikon* (Willaschek et al. 2015).
[5] In this chapter, I am interested in the objective validity of ideas with respect to speculative cognition. I am not therefore discussing whether ideas can obtain objective validity from a practical point of view.

ideal provides “the *original image* for the thoroughgoing determination of the copy” (A569/B597).

> They provide an indispensable standard for reason, which needs the concept of that which is entirely complete in its kind, in order to assess and measure the degree and the defects of what is incomplete. (A569–70/B597–8)

The definition of ideal here introduced is highly general and sketchily anticipates arguments that will be fully—yet puzzlingly, as several commentators have noted—developed in the course of the chapter. Let me, however, already highlight the point that will represent the main concern of the present chapter. Note that Kant places great emphasis on the problem of objective reality of the ideal and ideas more generally understood. Note also that the use of this term is ambiguous. Although Kant talks of different ‘distances’ from objective reality, it would seem that ideas and ideals, given their transcendent status, are simply unable to become objectively real. But if ideas and the ideal cannot have objective reality, how can it be possible for them to maintain *some validity* in relation to cognition? Indeed, it may seem illegitimate to use representations that go beyond possible experience and have no relation to objects as “rules” and “standards” for systematizing empirical cognition. In this chapter, I will try to shed light on these ambiguities. In particular, I contend that Kant is here employing a particular understanding of “objective reality” (or “objective validity”)[6] that will be fully clarified only in the second part of the Appendix to the Transcendental Dialectic with the transcendental deduction of the ideas. This deduction, although not particularly investigated in the literature, will be key to understanding the positive use of the idea of God.

After introducing ideals in general and using particular examples as that of the Stoic sage, Kant’s subsequent discussion focuses on the concept of *ens realissimum*. This is not a matter of choice. The concept of *ens*

[6] It may be tempting to apply the distinction between ‘objective reality’ (*objektive Realität*) and ‘objective validity’ (*objektive Gültigkeit*) (see, e.g., Bunch 2010) to the present case (for example, arguing that ideas are objectively valid without possessing objective reality). However, there is lack of textual evidence for drawing such a distinction here (see, e.g., A670/B698). I therefore prefer to treat these terms as synonyms (see Wagner 1967).

realissimum corresponds to the "transcendental ideal": an ideal which is necessarily required by the use of our reason (see A576/B604). Accordingly, what follows in Section Two of the chapter is the much debated and highly complicated derivation of the transcendental ideal from the rational sources of our mind. The function of the argument Kant presents in this section as well as its reconstruction constitute interpretative problems themselves. For the purposes of this chapter, I will follow the widely accepted assumption that this section is part of a long and uninterrupted story regarding the rational origin of the idea of God.[7] I will give only a rough sketch of the main line of argument presented.

Several reconstructions of Kant's derivation of the transcendental ideal have been proposed. Allison proposes a three steps argument, Grier has four steps in her reconstruction, and finally Willaschek has recently proposed a five-step derivation.[8] I will follow the latter one for it includes all the elements of the principal line of reasoning. The argument starts with a contrast between two principles: a logical principle and a transcendental principle which in turn contains a transcendental presupposition. These represent the first three steps (1, 2, and 3) of the argument. The first principle is the "principle of determinability" (PD) which applies to concepts only. The principle says that:

> 1) PD: "of *every two* contradictorily opposed predicates only one can apply to it." (A571/B599)

This is a merely logical principle for, as Kant explains, it rests on the principle of contradiction and abstracts from the "content of cognition" (A571/B599). It says that for every concept and any predicate P, if P is added to the concept then non-P cannot also be added to its content. Suppose that the concept 'human being' is indeterminate as to whether a human being is 'mortal.' I can only add the predicate 'mortal' (P) or 'non-mortal' (non-P) to it.

[7] See, e.g., Grier 2001, 233, and Willaschek 2018, 219. Strawson argues that Kant offers two different accounts of the origin of the ideal: one in Section Two and one in Section Three; see Strawson 1966, 221 fn.
[8] See Grier 2001, Allison 2004, and Willaschek 2018.

The second, transcendental principle is "the principle of thoroughgoing determination ("*durchgängige Bestimmung*") (PTD) and specifically applies to objects. It says:

> 2) PTD: "among *all possible* predicates of *things*, insofar as they are compared with their opposites, one must apply to it." (A571–2/B599–600)

This principle goes beyond logic for "it deals with the content and not merely the logical form" (A572/B600). In other words, it is a synthetic principle that provides us not merely with the analytic determination of a concept through given predicates, but with "the complete concept a thing" (ibid.). It tells us that for every object and every possible predicate P, either P or non-P must apply to it. Here Kant seems to rehash the Leibnizian idea that only a 'complete concept'—that is, a concept determined with respect to all pairs of possible predicates—allows us to represent one individual thing.[9]

This principle, in turn, contains a transcendental presupposition. By contrast with PD, PTD does not simply consider a thing in relation to two opposite predicates. The complete concept of a thing requires instead the comparison of the thing with the "*sum total* of all predicates in general" ("*Inbegriff aller möglichen Prädikate überhaupt*"; A573/B601). PTD therefore presupposes the following:

> 3) SUM: "the material *of all possibility*, which is supposed to contain a priori the data for the *particular* possibility of everything." (A573/B601)

The presupposition of this material—the "storehouse," as it were, "from which all possible predicates of things can be taken" (A575/B603)—is of the utmost importance for it constitutes the transcendental basis for the derivation of the rationalist idea of God.

Before turning to the remaining two steps of the argument, let's briefly pause on these three steps which already pose a number of interpretative

[9] See, e.g., Leibniz, *Discours de Métaphysique*, §8. For a detailed comparison, see Wood 1978, 37–44.

riddles. Firstly, Kant does not really explain the move from PD to PTD. It is plausible to think, however, that PD presupposes PTD when applied to objects.[10] The general thought seems to be that in order for us to conceptually determine a single object we need to presuppose—at least hypothetically—that the object *is* completely determined. This reading, however, does not settle whether it is *legitimate* for us to make such a presupposition. Is this move transcendentally valid? Or is it a deceiving illusion affecting the dialectician?

From a critical point of view, the second step, that is, the very attempt at completely determining objects through concepts—therefore independently from sensibility—seems *prima facie* illegitimate: the dialectical residue of Leibnizian 'intellectualism' (see A275–6/B331–2), rather than a positive part of the critical system. In Kant's transcendental philosophy, objects are never conceptually given, but always given to us under the conditions of sensibility as appearances.[11]

The third step poses additional problems. Again, from a critical point of view, possibility is the agreement with the formal conditions of the understanding (see, e.g., A218/B265), not the "storehouse" of data that provides the content of objects. Leech convincingly argues that the presupposition of a sum total of possibility completes the formal conditions provided by the understanding as regards the content of phenomena (Leech 2017). But even granted such a completion, the sum total remains an idea—something "which has its seat solely in reason" (A573/B601). How could we meaningfully apply this idea to objects? This would again require some kind of objective validity attached to our ideas.

To make things worse, the last two steps of the argument seem even less plausible. The sum total of all possibility, Kant says, is still an indeterminate concept: "on closer investigation," however, we find that this idea "excludes a multiplicity of predicates, which, as derived through others, are already given, or cannot coexist with one another" (A573–4/B601–2).

[10] Following Willaschek 2018, 221–4.
[11] For a similar point, see also Grier 2001, 269.

Simply put, we do not need to include in the presupposed sum total more than it is strictly necessary for the reality of beings. A negation is not properly a reality, but a mere lack thereof (A574/B602). Properly speaking, therefore, the presupposed sum total contains only primitive, positive predicates (an "All of reality," *omnitudo realitatis*). The fourth step is therefore:

> 4) OMNITUDO: the transcendental substratum of determination is "nothing other than the idea of an All of reality (*omnitudo realitatis*)," of which "all true negations are nothing other but limits." (A575–6/B603-4)

The complete determination of this idea itself (the properly called *ideal*) is finally obtained only through the final step. The idea of an "All of reality" is itself a concept of an individual being (the *ens realissimum*) for the simple reason that we can completely determine it with the idea of reality: as a being which is only positively determined and therefore possesses all positive realities. The final step therefore amounts to:

> 5) ENS: the transcendental ideal is "the one single genuine ideal" that is "thoroughly determined through itself." (A576/B604)

This last part of the derivation has attracted considerable criticism for at least two reasons. First, it seems to ignore the possibility of "*real Repugnanz*" among positive predicates, thus failing to show that the *ens realissimum* is really possible.[12] In his pre-critical essays *The Only Possible Argument* and *Negative Magnitudes*, Kant explains that really repugnant predicates are predicates whose effects cancel each other out (e.g., *OPA*, 2:85; *NM*, 2:290). Now, the most real being cannot contain really repugnant predicates, for otherwise he would be characterized by "a deprivation or a lack" (the cancelled-out effects of repugnant predicates) and that would not be compatible with its positive nature (see *OPA*, 2:86). Following Wood 1978 and Willaschek 2018, however, I think that this does not pose a serious

[12] See Wood 1978, 56 fn., Klimmek 2005, and Chignell 2009.

threat to the idea of *ens realissimum*.[13] First, in the Ideal chapter Kant does not seem to discuss real repugnance in any significant way. Second, the most real being is only a rationally presupposed idea. As such, we are not required to prove its real possibility as an *object*. Indeed, as I will further argue in this chapter, the validity of such an idea will not be based on any determination of objects at all.

More problematically, the hypostatization in an individual being seems to blatantly presuppose the possibility of conceptually determining a being without appealing to sensibility. Indeed, Kant himself seems to dismiss this step as one "overstepping the boundaries of the vocation and permissibility" of the transcendental ideal (A580/B608). Reason, Kant explains, grounds the complete determination of things only on the *idea* of all reality, "without demanding that this reality should be given objectively, and itself constitute a thing" (ibid.). This step—specifically understood as the positing of a *real* thing—seems therefore to be unwarranted in the natural progression of reason.

2.2 The critical legitimacy of the ideal

As should already be evident from the above reconstruction, the question of the legitimacy of the rational progression that leads to the transcendental ideal is a thorny issue to disentangle. On the one hand, as several commentators suggest, Kant seems to merely reconstruct the fallacious reasoning of the metaphysician. Indeed, the principle of complete determination together with its presupposition of the material of all possibility seems at odds with the critical framework. On the other hand, Kant clearly admits some permissibility of the ideal as a mere idea "in order to cognize a thing completely" and for prescribing to the understanding the "rule of its complete use" (A573/B601). It is, however, highly difficult to understand, firstly, how an idea can be applied to our concepts of objects, and secondly,

[13] See Willaschek 2018, 227 fn., and Wood 1978, 59. According to Wood, Kant's critical philosophy allows him to remain agnostic as to whether God (as a noumenal reality) is really possible or not.

where exactly to draw a line between a legitimate and an illegitimate use of reason.

Following the clues Kant offers, several interpreters have tried to propose a critical reading of this section. In fact, after Wood's ground-breaking study (Wood 1978), there have been much work on the positive interpretation of the ideal: most notably, Longuenesse 1995, 2005; Grier 2001; Allison 2004; and Leech 2017. In the rest of this chapter, I will contend that such attempts are promising and grounded in the text. However, they all miss an essential element, without which the rehabilitation of the ideal cannot be made fully compatible with the positive use Kant attributes to the idea of God. This element is the crucial question of the objective validity of ideas that Kant clarifies only in the second part of the Appendix to the Transcendental Dialectic.[14] For clarity and convenience, I will build my analysis on Longuenesse's account of the transcendental ideal, which has generally been taken as a landmark in the recent literature.[15] It is particularly helpful to discuss her position for, although I share the same purpose of critically interpreting the Ideal chapter, my reading will substantially diverge from her proposal and hopefully solve the problems connected with it.

Longuenesse has argued that there is a "perfectly legitimate, critical reading for the move from the principle of complete determination to the

[14] A notable exception is Willaschek 2018. Willaschek does recognize that ideas have some kind of objective validity (e.g., 126) and briefly argues that the transcendental ideal itself can be positively used as a regulative principle of reason (223 fn.). However, he does not discuss how Kant substantiates these claims in the second part of the Appendix nor he explains the relevance the ideal has to the empirical investigation of nature. My contribution is meant to expand and further develop his approach.

[15] Leech 2017 substantially follows Longuenesse's account and highlights interesting modal features attached to the ideal (see, e.g., 10). Willaschek 2018 refers to Longuenesse's reading and interprets it in regulative terms (222). Grier 2001 criticizes at length Longuenesse's position. I will use some of her criticism to refine my reading of the ideal and I will agree with her on several points regarding the vindication of the *ens realissimum* as such (242 fn.). However, my reading will diverge significantly from hers: she addresses the problem of the objective validity of the ideal by relying on her general account of transcendental illusion (which I criticize in Chapter 1). She does not focus on the transcendental deduction of the ideas—in which, on my view, the problem is finally addressed—and the relation to the systematic unity of nature on the basis of which the deduction is conducted. Accordingly, she maintains that PTD relates to things in general, not merely to empirical objects (239 fn.). On this crucial point, my reading is closer to Longunesse's account. Finally, Allison 2004 follows Grier's interpretation, although his analysis contains brief, insightful remarks on the relation between the ideal and the deduction (438, 441).

supposition of a sum total of all possibilities" (Longuenesse 2005, 220). On her reading, the principle of thoroughgoing determination (PTD) is a critical principle if restricted in its application to the objects of sense, or phenomena, *only*. Crucially, she operates such a restriction by reading the principle as following from the epistemology of the Transcendental Analytic. From the standpoint of the Analytic, she argues, the principle of complete determination is not even a new principle. Instead, "it is a principle that Kant could have given as a corollary of the principle of all synthetic judgments: 'the conditions of the possibility of experience are the conditions of the possibility of the objects of experience' (A111; A158/B197)" (ibid. 219).

In particular, she interprets PTD as the principle that merely follows from the *comparability* of any singular object of experience to every other possible object of experience, by virtue of belonging in the same concept of object of experience (ibid., 218).[16] As a result, the principle does presuppose a sum total of reality, but this sum total of reality is now understood as the sum total of *empirical* predicates, or of the realities given to us in space and time. Moreover, she notes that, according to the Analytic, a possible predicate is a predicate that "agrees with the formal conditions of experience" (A218/B265). Therefore, to compare the predicate of a singular thing with the sum total of possible predicates is to compare them with *all* empirical predicates (see Longuenesse 2005, 219 fn.). Finally, she concludes, nothing prevents the refinement of this sum total into the *omnitudo realitatis* of only positive predicates (ibid., 220).

This reading finds textual support in the last paragraphs of the section. Kant says that beside describing the natural progression of reason, we also need to discover the source of the illusion that drives our reasoning. He indeed locates the answer to this genealogical problem in the Analytic. The possibility of objects of sense, says Kant, is only the formal relation with our

[16] More specifically, she takes PTD as following "from [the principle of the possibility of experience] once it is understood that the latter includes the role of infinite and disjunctive judgment in reflecting objects under concepts and thus coming up with representations of individuated objects for our intuitions" (219). I skip interesting details of her account since they are not strictly required to understand the main point of her argument and the relevant criticism. For a more detailed analysis, see Verburgt 2011.

thought. Their material—"the reality in appearances (corresponding to sensation)"—, however, must be given (A581/B609). Without such an *empirical* material, "no possibility could be represented" (ibid.). As I understand Longuenesse's account, Kant goes on to formulate the *empirical* version of PTD (that is, limited in its application to appearances) which in turn presupposes an *empirical* SUM, namely:

> PTDe: "an object of sense can be completely determined only if it is compared with all the predicates of appearance and is represented through them either affirmatively or negatively." (A581/B609)

> SUM_e: "nothing is an object for us unless it presupposes the sum total of all empirical reality ("*Inbegriff aller empirischen Realität*") as condition of its possibility." (A582/B610)

If PTD_e, SUM_e, and presumably also $OMNITUDO_e$ are legitimate steps (since they follow from the Analytic), where does the dialectical error come from? According to Longuenesse, the error would consist in transforming a unity of the *understanding* into a unity of *reason*. The textual evidence for this reading would be contained in the last paragraph of the section:

> That we subsequently hypostatize this idea of the sum total of all reality, however, comes about because we dialectically transform the *distributive* unity of the use of the understanding in experience, into the *collective* unity of a whole of experience; and from this whole of appearance we think up an individual thing containing in itself all empirical reality, which then—by means of the transcendental subreption we have already thought—is confused with the concept of a thing that stands at the summit of the possibility of all things, providing the real conditions for their thoroughgoing determination. (A582–3/B610–1)

The dialectical transformation, on her reading, is the transformation of the distributive unity of the understanding (that is, the logical unity that results from comparing an object of sense with all possible predicates) into the collective unity of a "whole of experience" (the unity of the totality of empirical reality), which is then hypostatized. Therefore, Longuenesse argues for the legitimacy of SUM_e and $OMNITUDO_e$ only as principles generated by the

logical use of the understanding. It is true, Longuenesse concedes, that some collective unity is presupposed "as given as a whole in space and time," but this is only an "experientially presupposed whole of reality," and must be distinguished from the *critical* "discursively thought whole of realities or determinations" (Longuenesse 2005, 220–1).[17] The hypostatization into an individual being, which is grounded on the collective whole, turns out to be an illegitimate move. Her reading does not thereby license a positive use of the *ens realissimum*, but only of the result of the previous step: the 'All of empirical reality' (OMNITUDO$_e$).

While this may seem convincing at first glance, there are a number of discrepancies between the text and the offered reading that undermine the plausibility of the overall picture. Let's focus on the crux of her argument. First, as noted by Verburgt, it is surprising that Longuenesse reads the principle of thoroughgoing determination as a principle of the understanding—whereas Kant is clear that such a principle "is grounded on an idea which has its seat solely in reason, which prescribes to the understanding the rule of its complete use" (A573/B601; see Verburgt 2011, 252). As a result, she reads the transition from distributive unity to collective unity as an illegitimate move. But this clearly fails to consider that collective unity (the unity of the totality of empirical reality) can have a positive meaning from the standpoint of reason—when it is legitimately used for the sake of the thoroughgoing determination of concepts of empirical objects.

There is no lack of evidence for this more plausible reading. First, in the passage quoted above the transformation of the distributive unity into the collective unity of reason is only the first step and, as it were, a pre-condition of the dialectical hypostatization.[18] The dialectical hypostatization only happens with what Kant calls "transcendental subreption": the mistaking of an empirical principle for a principle that applies to things in general

[17] I take Longuenesse to mean that presupposing a whole of appearances, although subjectively necessary, is ultimately erroneous. As noted by Grier 2001, 239, and Verburgt 2011, 251, this distinction is more confusing than helpful.
[18] This is duly noted by Allison 2004, 407.

(A583/B661).[19] We should therefore carefully distinguish between the transformation into the collective unity of reason and the hypostatization, which is a misuse of reason *when combined with the subreption*. In the important footnote to this paragraph, Kant identifies the former with the step of 'realization,' that is, of *transformation of a representation into an object*,[20] and the latter with a separate, second step:

> This ideal of the supremely real being, even though it is a mere representation, is first *realized*, i.e., made into an object, then *hypostatized*. (A583/B611)

That Kant leaves room for a positive meaning of collective unity and realization is then confirmed in a number of passages throughout the corpus. Most importantly, it is confirmed at the beginning of the Appendix, where Kant clearly recognizes a positive, regulative meaning of reason and its collective unity.[21]

> Thus reason really has as object only the understanding and its purposive application, and just as the understanding unites the manifold into an object through concepts, so reason on its side unites the manifold of concepts through ideas by positing a certain collective unity as the goal of the understanding's actions, which are otherwise concerned only with distributive unity. (A643–4/B671–2)

As we will see, the second part of the Appendix not only openly admits a positive use of the collective unity of reason, but it also explains how exactly we are critically allowed—indeed, we *must*—use it. This explanation will provide an important missing element for fully vindicating PTD as a transcendental principle of reason. This is particularly important for if PTD is recognized as a principle of reason—not of the understanding as suggested by Longuenesse—its objective validity becomes in itself a problem. How can we legitimately realize the ideal and apply it to objects of sense? The question of legitimacy amounts, as we will see in detail, to the problem of

[19] Kant also defines transcendental subreptions as the "the ascription of objective reality to an idea that merely serves as a rule" (A509/B537).
[20] Literally speaking, it makes little sense to transform a representation into an object. What Kant has in mind, however, is the attribution of an 'object' to a representation.
[21] Noted by Verburgt 2011, 250, and previously by Heimsoeth 1969.

distinguishing between a dialectical and a non-dialectical *realization* of the ideal. This distinction will be key to understanding the positive use of the ideal.

The second major problem with Longuenesse's account is more evident and points towards the same direction of inquiry. According to her reading, the natural progression of reason is legitimate up until the 'All of empirical reality.' But if this is the case, why does Kant insist so much that the ideal itself—the *ens realissimum*—has a necessary and indispensable use? Longuenesse asks herself this question and answers that this move is only motivated by the need to maintain a role for God in the realm of practical philosophy (Longuenesse 2005, 228). As noted by many, this cannot be a satisfactory answer.[22] Kant not only advocates for a regulative use of the idea of God, he also explicitly specifies that the idea of God is necessary from a purely *speculative* point of view. To quote the phrase with which I opened the chapter: "we *must* presuppose" the idea of God in the investigation of nature. From which it is clear that the idea of God (and not merely the *omnitudo realitatis*) has a theoretical, not only practical function.

3. The transcendental deduction of the ideas

3.1 Why a transcendental deduction of ideas?

In the previous section we saw that the legitimacy of the transcendental ideal hinges upon its "realization," namely its transformation into some kind of 'object.' The correct understanding of this move is still highly unclear at the end of Section Two of the Ideal of Pure Reason. It is true that Kant states that the transcendental ideal can be legitimate as a necessary idea for the thoroughgoing determination of concepts (see, e.g., A573/B601), but no clear explanation is offered of how an idea can be critically realized. Indeed, one might be tempted to simply equate this realization with the illegitimate step of treating a mere idea as a thing given objectively. As already suggested, a way out from this dialectical quagmire is only given in the second part of the

[22] See, e.g., Grier 2001, 242, and Verburgt 2011, 246.

Appendix where Kant presents the much-neglected transcendental deduction of ideas. In this section, I contend that the transcendental deduction of ideas reveals a positive, critically legitimate way of realizing an idea of reason from the theoretical perspective.

It is important to briefly clarify, first, why a deduction of the ideas of reason is required. We saw in Section One of the Ideal that ideal representations are remote from objective reality, and yet Kant maintains that they have some legitimate and necessary application to objects of experience. In the second part of the Appendix, Kant finally clarifies this ambiguity. He says that if ideas "are to have the least objective validity […] and are not to represent merely empty thought-entities […], then a deduction of them must definitely be possible" (A670/B698). This deduction which, as Kant specifies, diverges quite far from that of the categories, is "the completion ("*die Vollendung*") of the critical business of pure reason" (ibid.).

Despite such resounding statement, this deduction has not been particularly studied in the secondary literature. One reason behind this interpretative dismissal is that the deduction does not fit well with a common reading of the ideas of reason. According to this interpretation (which we may call 'methodological interpretation'),[23] ideas are methodological tools or useful guidelines that we may use in order to extend the system of our cognitions.[24] Since ideas have a merely logical function, it is not necessary to show that they have a legitimate application to objects. As a result, the transcendental deduction of the ideas is a negligible if not misleading part of the Dialectic. This reading, however, cannot be textually satisfactory. Kant simply *does* offer a highly sophisticated transcendental deduction of the ideas of reason. And such deduction is meant to show that ideas are not just useful methodological guidelines, but "indispensably necessary" principles that guide the understanding and assure its complete use (A644/B672).

There is, however, a second, more subtle reason why the deduction has not attracted particular attention. It presents a notion of objective validity

[23] Following Abela 2002 and Geiger 2003.
[24] See, e.g., Horstmann 1989 and Guyer 1990.

(and of realization of the idea) that is not fully compatible even with more charitable readings of the objectivity of ideas (what we may call the 'descriptive interpretation'). This interpretation makes the following plausible distinction. Ideas of reason seem to describe objects that go beyond the possibility of experience—noumenal objects or things in themselves. Since our knowledge is limited to the field of experience, we cannot *know* whether our ideas actually correspond to those objects. For example, we cannot know whether there is an existing being the corresponds to our idea of God. However, we can still grant our ideas of reason a weaker epistemic status than knowledge. Since, as Kant says, ideas are necessary to regulate the understanding and promote the investigation of nature, we are required to merely *assume* that they determine things in themselves.[25] Various ways have been proposed to understand such weak assumptions (for example, as hypotheses or as necessary illusions).[26] Although I cannot here discuss these proposals in detail, let me point out that they all agree that ideas are objective inasmuch as they *potentially describe* objects. Importantly, this reading seems to find support in a form of theoretical belief Kant briefly introduces in the Canon of Pure Reason—the so-called "doctrinal belief" (see A825/B853–A827/B855).

Taking my cue from a recent normative approach to the ideas of reason (Massimi 2017a, forthcoming; and Kraus 2018, 2020), I will argue that Kant's view on the objectivity of ideas is more radical than generally assumed by the descriptive reading. The objectivity of the ideas does not consist in their actual or potential characterization of noumenal objects. Rather, their objectivity consists in the relational function they afford. As we will see, ideas are legitimately realized as "objects in the idea." An object in the idea is not an object in any common understanding of the term. It is rather a "schema" that allows us to progressively systematize objects of sense. Crucially, Kant does not simply deduce ideas as schemata, he also specifies how we should understand the content of ideas in non-descriptive

[25] See, e.g., Grier 2001, 276–7, Allison 2004, 330, and Pickering 2011.
[26] See Willaschek 2018 for the first proposal, and Grier 2001 and Allison 2004 for the second one. I discuss these interpretations in detail in Chapter 1.

terms, namely as *analogies*. In the next section, I will elucidate these points by looking at the text more closely. I will first reconstruct the two steps of the deduction and the analogical nature of ideas. Finally, I will explain what this entails for the idea of God.

3.2 The realization of the idea

Ideas are deduced in two steps. The first step revolves around the distinction between presupposing an "object absolutely" (*Gegenstand schlechthin*) and an "object in the idea" (*Gegenstand in der Idee*; A670/B698). Kant is finally spelling out how to critically realize an idea (*transform it into an object*)—a realization that was only dialectically presented in the Ideal chapter. An object given absolutely is an object that can be determined through concepts. Objects of sense are of this kind: I can use the concepts of the understanding (causality, reality, etc.) to determine them regardless of whether they exist or not. On the other hand, an object in the idea is an object only in highly specific sense of the term. As Kant says, an object in the idea is, strictly speaking, a "schema":

> [An object in the idea] is only a schema for which no object is given, not even hypothetically, but which serves only to represent other objects to us, in accordance with their systematic unity, by means of the relation to this idea, hence to represent these objects indirectly. (A670/B698)

Let's try to unpack this brief but dense passage. First, an object in the idea is not a hypothetical object that might or might not exist. An object in the idea is rather a "schema" or an "imagined object" ("*eingebildeter Gegenstand*"; ibid.) that is not meant to represent anything 'out there'—instead, its function is to indirectly represent "other objects to us." As Kant continues, if we relate an idea "straightway to an object," we simply "would not be able to justify its objective validity" (ibid.). But why is this the case? After all, some of our ideas are free of logical contradictions and can be used to think entities that

transcend our experience.[27] Kant, however, argues that logical consistency is not a sufficient condition for assuming ideas as *objectively valid representations*. As Kant puts it:

> Nevertheless, in order to assume something it is not enough that there is no positive hindrance to doing so, and we cannot be allowed to introduce mere thought entities that transcend all our concepts, though they contradict none of them, as real and determinate objects merely on credit, just so that speculative reason can complete its business as it likes. (A673–4/B701–2)

I take Kant to mean that, although it is possible to use ideas to think entities that transcend our experience, this is not how ideas obtain objective validity. The objective validity of ideas cannot rest, as it were, on a mere *wishful assumption* of reason. Since we cannot know whether the object of the idea is more than a merely logically possible "thought entity," we also do not know whether the idea is objectively valid. This is an important insight for it casts serious doubts on those interpretations that read the objectivity of ideas of reason in terms of descriptive assumptions about noumenal objects. As Kant makes clear:

> One mistakes the significance of this idea right away if one takes it to be the assertion, or even only the presupposition, of an actual thing to which one would think of ascribing the ground for the systematic constitution of the world. (A681/B709)

Ideas should not be taken even as mere *presuppositions* of objects. As such, taking them as descriptive of objects and granting them weaker epistemic status than knowledge cannot explain their objectivity. This point, I contend, can be extended to doctrinal belief. According to Kant, belief is an epistemic state that only requires subjective grounds for its legitimate formulation (see A823/B851). In particular, "doctrinal belief" is presented as a kind of

[27] For Kant, the psychological and theological ideas are free of logical contradictions, whereas the cosmological ideas inevitably lead us to antinomies if we assume them as objective; see A673/B701.

theoretical belief (A825/B853). The fact that the idea of God is logically consistent and subjectively useful for the investigation of nature, for example, may be sufficient in order to believe in its existence from a theoretical point of view. The status of doctrinal belief is problematic and has been assessed in very different ways by commentators.[28] A careful analysis of this particular type of belief and its relation to the transcendental deduction of ideas would therefore require a separate discussion. Let me, however, point out that doctrinal belief is unsuited to explain the objective validity of ideas. For doctrinal belief does not rule out the possibility that the objects of ideas are not really existing.[29] As a result, it can only ground the belief that an idea is objectively valid, but it fails to show that an idea *is* objectively valid. Let me also suggest that from this it does not necessarily follow that the transcendental deduction of ideas and doctrinal belief are incompatible. Kant could maintain that while ideas must be strictly deduced in non-descriptive terms, it may still be subjectively possible or useful to believe in God's existence from a theoretical point of view.[30]

Now, if objects in the ideas are not object in any standard meaning of the word, what are they? Kant's use of the word "schema" should help us understand its meaning. In the Analytic, a schema is a third thing that links pure concepts with objects of sense (A138/B177). Here, objects in the ideas seem to play a different, yet similarly *relational* role. They are "imagined objects" that act as the "ground or cause" ("*Grund oder Ursache*") from which we can derive objects of sense (A670/B698). They do not represent the actual or potential grounds of the objects of experience. Rather, they are mental images that allow us to progressively represent those objects *as* systematically organized. As a schema, therefore, the object in the idea is a *third thing* which neither coincides with the objects of experience nor with their systematic unity[31]—it is instead the relational object that mediates

[28] For a detailed analysis, see Pasternack 2010.
[29] A similar suggestion can be found in Kraus 2020.
[30] Cf. Pasternack 2010, 214–5, who argues that doctrinal belief is the product of deception and is incompatible with the legitimate use of reason.
[31] See schemata in the Transcendental Analytic, in particular A138/B177.

between the two and allows our empirical investigation to converge towards systematic unity.

Accordingly, ideas are not, as Kant says, “ostensive” concepts that show us how a noumenal object is or might be constituted (A671/B699). They are rather rules that tell us how we ought to systematize objects of experience. As Kant puts it, they “should not be assumed in themselves,” but “their *reality* should hold only as that of a schema of the regulative principle for the systematic unity of all cognitions of nature” (A674/B702). To sum up, the objective validity of ideas does not consist in an actual or potential relation to objects, but in the relational function they afford. This function consists in the progressive systematization of objects of experience they make possible.

The second, final step of the transcendental deduction of ideas consists in arguing that if the three *kinds* of transcendental ideas (psychological, cosmological, and theological) meet the above illustrated requirements and are realized as relational objects in the idea that lead to systematic unity without “going contrary to experience,” then it is a “necessary *maxim* of reason to proceed in accordance with such ideas” (A671/B699). This is how ideas are transcendentally deduced. As anticipated by Kant, this indirect and relational objective validity is quite different from that of the categories, but this does not mean that ideas are not properly transcendental. It only means, as Kant clearly says, that the deduction proves ideas as *regulative*, *non-constitutive* principles (see A671/B699). They do not constitute experience, but they are necessary principles for attaining systematic unity of empirical cognition in general.

This step, however, still leaves us with the question of why these and only these three ideas are capable of functioning as such.[32] I think that this follows quite straightforwardly from (i.) the realization of ideas as “schemata”; and (ii.) the domains Kant attaches to each idea. Starting from the latter point, Kant distinguishes the sphere of applicability of each idea as follows: the first *psychological* idea, the idea of the soul, connects the phenomena of

[32] See also Allison’s instructive analysis of this problem (Allison 2004, 439).

our mind; the *cosmological* idea, the idea of the world, connects appearances of nature; and finally, the *theological* idea, the idea of God, connects everything that belongs to possible experience (see A672/B700). Now, since ideas are the schemata through which we attempt to systematize empirical cognition, to systematize the domain of the mind necessarily requires the schema of the idea of the soul, to systematize the world necessarily requires the schema of the idea of the world, etc.[33] This also explains why the idea of God has a privileged treatment in the Appendix: by unifying possible experience in general, it simply has the broadest application. This ultimately results in the close relation between God and "systematic *complete* unity" (that is, systematic unity unrestricted to any particular domain; A677/B705).

3.3 Analogies, not descriptions

The above *relational* reading of the deduction of the ideas should have partly clarified the meaning of the "realization" of an idea into an object. There is, however, an important aspect of the idea that we still need to specify. If ideas are mere schemata that do not correspond to any objects out there, how can we still positively characterize their content? In the Appendix, Kant not only deduces the objective validity of ideas as schemata, but he also specifies how we are allowed to qualify the content of an idea in non-descriptive terms.

Recall that the object in the idea acts as the imaginary "ground or cause" of sensible objects. In order to think these imaginary grounds or causes we cannot but rely on concepts of the understanding. These concepts lose descriptive power when not applied to objects of sense so that, as Kant frequently remarks, objects in the idea should not be assumed "in themselves" or as "things in themselves" (A674/B702). The noumenal ground of sensible objects remains beyond our conceptual determination. Objects in the idea should be assumed, instead, as "analogues of real things" ("*Analoga von wirklichen Dingen*"; ibid.). 'Analogy' is a technical term for Kant that fits particularly well with the relational reading of ideas suggested in this chapter.

[33] Allison 2004, 441, has a similar suggestion.

As Kant explains in the Analytic, philosophical analogies do not give us the "identity of two quantitative but of two qualitative relations" (A180–1/B222–3). In the *Prolegomena*, Kant specifies that analogical thinking "does not signify, as the word is usually taken, an imperfect similarity between two things, but rather a perfect similarity between two relations in wholly dissimilar things" (*Prolegomena*, 4:357–8). I take Kant to mean that, in philosophy, analogies do not give us real or tentative descriptions of a to-be-determined object, but rather qualify the *relation* to an object that remains unknown to us. For example, a philosophical analogy of the form '*a* : *x* = *b* : *c*,' where only *a*, *b*, and *c* are known to us, does not allow us to attempt a derivation of *x*, but only establishes a relation between *a* and *x*.[34]

This understanding of analogies finds confirmation in the Appendix. By acting as the imaginary ground of the systematic unity of objects of sense, the object in the idea does not in any way attempt to establish a similarity with (or a 'description of') the noumenal ground of appearances (the unknown 'x'). Rather, as Kant says:

> We are thinking of a Something about which we have no concept at all of how it is in itself, but about which we think a relation to the sum total of appearances, which is analogous to the relation that appearances have to one another. (A674/B702)

The object in the idea is a mere "Something" (*Etwas*) that leaves the ground of appearances completely undetermined with respect to its attributes—"how it is in itself," or its "inner property" (A675/B703). Thinking such something qualifies, instead, the relation between appearances and their unknown ground (*a* : *x*). This relation can be thought as analogous to the relations existing among appearances, namely as an *empirical relation* (*b* : *c*). In other words, we can use concepts of the understanding (that have their proper use only within the world of sense) to positively characterize the type of relation an unknown ground has to objects of sense. This positive characterization is

[34] For a critical analysis of philosophical analogies, see Callanan 2017.

legitimate because it avoids establishing a similarity between our ideas and noumenal objects.[35]

These points can be made clearer if we take a closer look at the specific idea which concerns us in this chapter: the idea of God. In accordance with the general account given above, the idea of God is "the idea of something on which all empirical reality grounds its highest and necessary unity" (ibid.). If we assume such an idea, we do not attempt a description of the inner properties of the noumenal ground of empirical reality, but, as Kant says, we "deal satisfactorily with all other questions concerning the contingent" and "consider the objects in one complete whole" (A676/B704). As Kant puts it, we are presupposing a ground "*relatively*," not "absolutely" (ibid.). The subtle thought is the following. To assume God as the ground of the empirical reality *absolutely* would mean to apply the concepts of the understanding to something outside the world of sense as their real or potential determinations:

> The concepts of reality, substance, causality, even that of necessity in existence have, beyond their use in making possible the empirical cognition of an object, no significance at all which might determine the object. (A677/B705)

These concepts only make sense within the empirical world—for explaining the possibility of objects of sense. We can, however, still assume the same unknown being *relatively* to the world of sense—as an object in the idea or a schema.[36] Indeed, since this idea is "unavoidably necessary for approximating to the highest possible degree of empirical unity" (A677/B705), we *must* presuppose and realize this idea:

> I am not only warranted, but even compelled to realize this idea, i.e., to posit for it an actual object, but only as a Something in general with which I am not acquainted at all and to which, as a ground of that systematic unity and in relation to that, I give

[35] The same points can be found in the *Prolegomena*: Kant explains that analogical thinking allows us to avoid transposing anthropomorphic properties to the highest being, which remains "unknown to us"; see *Prolegomena*, 4:358–9.
[36] See also *Prolegomena*, 4:359.

> such properties as are analogous to the concepts of the understanding in its empirical use. (A677–8/B705–6)

Here the realization of the idea is strictly conducted for the sake of the "greatest possible empirical use of my reason" (ibid.). Since this use is necessarily based on the idea of "complete systematic unity," then I can and indeed must posit something that grounds such complete systematic unity—namely, the idea of God. I can thereby apply concepts of the understanding to this something and think it "according to the analogy of realities in the world, of substances, causality, and necessity"; A678/B706): as a "being that possesses all of these in their highest perfection" (ibid.). This in turn allows me to investigate nature as systematically organized in terms of realities, substances, causal connections, etc.

As I showed in this section, Kant does provide a transcendental deduction of ideas that licences their objective reality and indirect application to objects of sense in the second part of the Appendix. In particular, I showed that Kant illustrates a realization of ideas as schemata that is not dialectical, but rather legitimate and necessary for the greatest possible empirical use of reason. The idea of God is the particular schema that allows the complete systematic unity of the world as a whole. We can think this schema only by analogically applying our concepts, including that of reality, to it. Now, to think God as the being that specifically possesses reality in the highest perfection is to think God as the most real being. But what does it mean to analogically think God as the *ens realissimum*?

4. The analogical *Ens Realissimum*

In Section 2, I reconstructed the natural progression of reason according to which the transcendental principle of thoroughgoing determination presupposes the material of all possibility, as the sum total of all predicates of things in general. This whole of possibility is then refined to its subset of positive predicates and then hypostatized in one individual being, the *ens realissimum*:

PD → PTD → SUM → OMNITUDO → ENS

Kant is there reconstructing the dialectical steps that lead the metaphysician astray. But, as we saw, he also gives important clues on how to critically interpret this transcendental principle and its presupposition. Most notably, Kant suggests that, with the latter, we are only presupposing an idea which can prescribe to the understanding the rule of its complete use. In the final paragraphs of the section, he also suggests that the principle could be legitimately applied if restricted to the objects of sense. At the same time, Kant gives also opposite indications: it seems that the hypostatization itself is an illegitimate move and that the whole process can be classified as dialectical. These ambiguities have led to interpretative difficulties. There was in fact an important element missing and that only the completion of the critical business finally provides: the transcendental deduction of the ideas, and particularly of the idea of God. Without this element, it is indeed highly dubious how an idea can regulate concepts and be transcendental in the sense of applying to objects of sense at all. In this section, I contend that the transcendental deduction finally warrants a positive use of the *ens realissimum* as it is described at the end of Section Two of the Ideal.

As I argued, the key step in the natural progression of reason consists in the 'realization' of the idea: that is, in transforming the idea of the sum total of all possibility presupposed by the transcendental principle of complete determination into a kind of 'object,' which is then hypostatized. We now know how to distinguish the dialectical from the correct realization of the idea. In the former case, the idea is transformed into the concept of an object and the ideal is confused with a condition of possibility of things in general. This is the 'transcendental subreption' Kant talks about at the end of Section Two of the Ideal chapter. By realizing the idea in this way, we illegitimately end up using PTD in *constitutive* terms. But the second kind of realization licences instead a perfectly legitimate, *regulative* use of the same idea and of the resulting principle. This realization consists in transforming the idea of the sum total (the basis of the ideal) into an *object in the idea* (or *schema*): that

is, a something which in itself remains unknown to us, and yet we can *analogically* think in accordance with the concepts of our understanding, in particular with the concept of reality. We are allowed to do this not in order to determine the idea as an object, but in order to ground the complete empirical use of the understanding—here specifically understood as the complete determination of our concepts of objects of sense.

One might here object that descriptive readings of the ideas of reason already successfully explain the distinction between regulative and constitutive uses of the ideas of reason without interpreting ideas as analogically thought schemata. As we saw, descriptive readings of ideas distinguish between taking ideas as determinations of things in themselves (constitutive use of reason) and merely assuming them as such (regulative use). Since these assumptions are not claimed to be true of objects, it seems that descriptive interpretations avoid transforming ideas into concepts of objects. However, I do not find this interpretative strategy entirely successful. For even if descriptive readings may avoid taking ideas as concepts of actual objects, they still interpret them as *potentially descriptive* representations. As we saw, however, we cannot grant these representations objective validity "merely on credit"—consequently, they are just "thought entities" with no valid application to objects (see 3.2). But if this is correct, it also follows that we cannot use them as regulative principles that necessarily guide our investigation of objects of sense. In other words, even if descriptive readings may avoid taking ideas in constitutive terms, they still fail to justify their regulative use with respect to objects of experience.[37]

The relational, analogical reading of ideas finally allows us to understand the positive remarks included in the reconstruction of the dialectical illusion that make the interpretation of the ideal so difficult to discern. At the end of the derivation, Kant says:

[37] More strongly, Willaschek suggests that interpretations of the ideas of reason as illusory presuppositions tacitly rely on the identification of the idea's objectivity with its being constitutive; see Willaschek 2018, 112.

> It is self-evident that with this aim—namely, solely that of representing the necessary thoroughgoing determination of things—reason does not presuppose the existence of a being conforming to the ideal, but only the idea of such a being, in order to derive from an unconditioned totality of thoroughgoing determination the conditioned totality, i.e., that of the limited. (A577–8/B605–6)

The thought here clearly anticipates the deduction given only later in the second part of the Appendix. For the idea has objective reality only inasmuch as it grounds the thoroughgoing determination of the "conditioned." "Conditioned," however, is still an ambiguous term: it may refer both to empirical and to non-empirical objects. Kant restricts the application to empirical objects at the end of the section, where he provides us with the source of the natural illusion of PTD. Since we can now separate the dialectical from the proper use of reason, we can also positively interpret this genealogy without implausibly reading PTD as a principle of the understanding.

As we saw, the illusion is said to result from the insufficiency of the formal conditions of possibility of experience. The empirical content of appearance has to be given to sensation and represents the condition of material possibility of objects of sense. Kant goes on to spell out the new version of PTD:

> PTD*: "now an *object of sense* can be thoroughly determined only if it is compared with all the *predicates of appearance*, and is represented through them either affirmatively or negatively." (A581/B609; emphases added)

The principle now states that for every *empirical object* and every possible *empirical* predicate P, either P or non-P must apply to it. With this restriction Kant gives the Leibnizian ideal of complete determination a critical twist. As noted by Wood, Kant does maintain the Leibnizian ideal of knowledge of objects as complete determination, but the latter is not grounded in conceptual analysis anymore. It is now a regulative *task* of synthesis which is

grounded on an idea of reason.[38] PTD* is not, therefore, as argued by Longuenesse, a principle of the understanding (PTD_e). It is instead a principle of reason for the complete use of the understanding. The idea on which the regulative task of synthesis is grounded is that of a sum total of realities in appearance.

> SUM*: "nothing is an object for us unless it presupposes the sum total of all empirical reality as condition of its possibility." (A582/B660)

This idea can be critically realized as an *object in the idea*—that is, as a schema for the complete determination of empirical objects. As we saw in the previous section, we are compelled to think the relation between objects of sense and the ground of their systematic unity in analogical terms. In this case, we analogically think what grounds the complete determination of objects of sense as the sum total of empirical reality.[39] From this SUM*, we can further derive an analogical OMNITUDO* as the subset of positive empirical reality. Do we need to stop here in the derivation as suggested by Longuenesse? Or can we also proceed with a non-dialectical hypostatization? I contend that if grounded in a critical, legitimate realization, the *omnitudo realitatis* can also be further hypostatized as an individual ideal being, namely as an analogically thought *ens realissimum* (ENS*): as Kant puts it, "an individual thing containing in itself all empirical reality" (A582/B610). By doing this, we are not determining an individual being, but only thinking it as a schema for the complete use of the understanding. This is not only compatible with the admission of a regulative function of the idea of God in the theoretical realm, but also specifically confirmed by passages in which Kant explicitly assumes the *ideal itself* as a regulative principle. Kant, for instance, says that "the ideal of the highest being is, according to these considerations, nothing other than a *regulative principle* of reason" and that "systematic unity of nature cannot be set up as a principle of the empirical

[38] See Wood 1978, 41. See also *Refl*. 6256, 18:533, and *Refl*. 6290, 18:559. For a non-regulative reading, cf. Rohs 1978.
[39] It is worth noting that Kant specifies that, strictly speaking, the sum total is to be conceived as a *ground* (A579/B607).

use of reason except on the basis of the idea of a most real being as the supreme cause" (A619/B647).

To sum up, the non-dialectical derivation of the ens *realissimum* amounts to:

$$PD \rightarrow PTD^* \rightarrow SUM^* \rightarrow OMNITUDO^* \rightarrow ENS^*$$

We start from a merely logical principle of determinability that applies to concepts (PD). We then apply PD to empirical objects, thus following PTD*. By doing so, we presuppose the regulative idea of a sum total of empirical realities (SUM*), which reason further refines into its positive subset OMNITUDO* and finally hypostatizes as an ideal individual ENS*. That we end up with the illegitimate sequence is due to the fact that we mistake an *object in the idea* (SUM*) for the concept of an *object* (SUM), and thereby we transform a *regulative*, empirical principle (PTD*) into a *constitutive* principle that determines things in general (PTD).[40] From this principle, we then derive the entire dialectical, metaphysical progression we saw in Section 2.

5. Other 'divine' sources of systematicity

In the previous section, I suggested that the analogical conception of the *ens realissimum* finally licenses a positive use of the ideal and that such a conception is an important component for thinking the whole of empirical nature as systematic. I did not suggest, however, that this is the only source that explains the relation between the idea of God and systematicity. Against readings that explain systematicity exclusively in terms of God as the "wise author" (Pasternack 2011) or in terms of "the most real being" (Hoffer 2019), I will argue that this relation is multifaceted and complex. Although Kant sometimes attempts a unitary presentation of the regulative use of the idea of God, I will suggest that this hides several sources and a *gradual* conception of systematicity with different degrees of perfection. As we saw in Section 3,

[40] Note that PTD and SUM (as well as their versions*) are simultaneous (when we follow PTD, we *also* presuppose SUM).

the concept of reality is only one of the concepts that can be analogically applied to the idea of God in order to promote the systematic unity of our empirical cognition. Kant elaborates on two other analogical applications of concepts as sources of systematicity.

First, in Section Three of the Ideal chapter, Kant explains that the merely speculative origin of the *ens realissimum* is too evident for reason to be persuaded that it is in fact an existing being (see A583–4/B611–2). There is, however, another source that urges reason to posit an existing being: the demand for an absolutely necessary being. Reason identifies such being with the *ens realissimum*, as the most suitable concept for such a notion of existence. Reason does so illegitimately through a not fully justifiable abductive inference. Notoriously, Kant goes on to reject the two transcendental proofs of the existence of God (the Ontological and Cosmological proofs). After this rejection, he purports to show the origin of the "dialectical but natural illusion" that leads us to "realize and hypostatize" the concepts of necessity and highest reality (A615/B643).

It is worth noting that the pattern Kant follows in this explanation is the same we find at the end of Section Two of the Ideal. Again, there is a natural illusion that leads us to metaphysical errors—with the difference that here Kant specifically deals with the idea of necessary existence and, subsequently, with the combination of necessary existence and reality (see A619–20/B647–8). The non-dialectical, critical reading of the argument reads as follows: "in going back to the conditions of existing I can never *complete* the existing without assuming a necessary being, but I can never *begin* with this being" (A616/B644).

Kant is here spelling out the regulative function of the idea of God in accordance with the concept of 'necessity in existence.' On the one hand, one should investigate nature under the presupposition of an "imagined first ground" with respect to everything that exists (ibid.). On the other, this is only an analogical application of the empirical concept 'necessity' to the unknowable ground of existing appearances. The analogy does not attempt to determine this ground but only allows us to pursue systematic unity in the

investigation of nature. In particular, such an assumption has a fundamental twofold function: by positing an ideal necessary being, (i.) it urges the further derivations of empirical relations among contingent objects. But since such a ground is only an idea that cannot be related to any object, (ii.) it also impedes any kind of transcendent explanations in science. In other words, the analogical application of the concept 'necessity' to the idea of God promotes the empirical investigation of nature without, however, succumbing to any form of "empirical complacency": [41] the idea that empirical explanations are complete and need no further derivation.

Second, as anticipated, systematicity 'comes in degree' for Kant and the concepts of reality and necessary existence do not exhaust its meaning. Kant in the second part of the Appendix talks about "the greatest systematic unity" (A694/B722) and the "highest formal unity" (A686/B714), which is generally equated with the "purposive" ("*zweckmäßig*") order of nature (A694/B723). This degree of systematicity corresponds to the transition from a mere classificatory order of things to a teleological ordering thereof—the one that represents the starting point for the third, equally fallacious, proof of the existence of God: the Physico-theological proof. Such an order would presuppose what Kant calls the "highest intelligence" of reason or *intellectus archetypus* (A695/B723). The closest Kant gets to explaining the relation between systematicity and purposiveness in the *First Critique* is the important footnote at the end of the Ideal. After being realized and hypostatized:

> [The ideal of God] through a natural progress of reason in the completion of unity, it is even *personified*; for the regulative unity of experience rests not on appearances themselves (of sensibility alone), but on the connection of its manifold by *understanding* (in one apperception); hence the unity of the highest reality and the thoroughgoing determinability (possibility) of all things seems to lie in a highest understanding, hence in an *intelligence*. (A697/B725)

[41] To borrow Zuckert's expression (Zuckert 2017, 105).

The regulative unity of experience requires not just a unity of appearances, but their connection under intellectual rules. The unity of the highest reality is thereby thought as lying in an analogical highest understanding, or intelligence. Is this characterization permissible somehow in the critical framework? Kant is aware that this might be a thorny issue and explicitly asks himself the question:

> Can we nevertheless assume a unique wise and all-powerful world author? *Without any doubt;* and not only that, but we *must* presuppose such a being. (A697/B725)

Kant's explanation of the answer is again modelled upon the transcendental deduction of ideas. By personifying the idea of God, we are not overstepping the boundaries of experience. As Kant says, this idea is "by no means related directly to a being different from the world," but it is employed as a schema for the "world's systematic unity" (A697/B725). Again, we are only presupposing a 'something' that remains in itself unknown to us—something that, however, must be presupposed in relation to the systematic unity of nature and analogically thought in accordance with the "empirical concept" of intelligence (ibid.). By doing this, we are not determining an object outside of the world, but we are only thinking "a being in the idea" ("*ein Wesen in der Idee*"; A698/B726).[42]

This final step of the progression of reason is particularly important for it permits us to fully exploit the analogical resources of our reason for the benefit of the "greatest systematic unity." This greatest systematic unity, Kant says, is "the school and even the ground of the possibility of the greatest use of human reason" and therefore this idea is "legislative for us" (ibid. and A695/B723). Indeed, when Kant exposes the regulative use of reason, he often refers just to this characterization. It has thereby been claimed that the personification of the "wise author" is the fundamental characterization in order to understand the relation between God and systematicity (cf., e.g.,

[42] As Kant also puts is, we are thinking "*how we ought to use*" the idea of highest intelligence "in relation to the systematic use of reason in regard to things in the world" (A697/B725; my emphasis).

Pasternack 2011). Others, for example Allison, have instead downplayed the importance of this step as nothing but an “icing on the cake” (cf. Allison 2004, 440). Neither of the two positions seems to me fully correct. Personification is an important second-order analogical characterization, which is, however, not strictly necessary for the classificatory systematicity of nature. It is instead required for attaining the greatest use of our reason and “opening up” for it the possibility of *teleologically* connecting phenomena (A687/B715).

6. Conclusion

Let me conclude this chapter with a brief summary of the conception of God we have obtained so far and its overall usefulness to empirical investigation. First of all, the account I presented does not claim to be exhaustive. I limited my analysis to the characterizations of God Kant explicitly formulates in regulative terms. This, however, does not mean that we cannot analogically employ, for instance, the concepts of ‘cause’ or ‘substance’ to promote the greatest empirical use of reason. Indeed, the transcendental deduction openly admits that this is possible. It is important to point out, however, that all these *analogical* characterizations are legitimate, if correctly understood, and together explain the relation between the idea of God, as a mere schema, and the different degrees of systematic unity we need to presuppose when we investigate nature.

As we saw, in all these positive characterizations of the idea of God the same terminological and theoretical machinery is at stake. Although ideal representations cannot be directly related to objects, they can be critically *realized* and obtain *indirect objective reality*. The idea is critically realized when it is presupposed as an “object in the idea,” or a “schema” for the systematization of empirical cognition. This corresponds, in the case of God, to presuppose an imagined ground of the systematic unity of the whole of nature. This ground is an unknown something that remains undetermined by the concepts of the understanding. However, since such a ground is necessary for promoting the empirical investigation of nature, we are compelled to think it in *analogical* terms. ‘*Ens realissimum*,’ ‘necessity in

existence,' 'highest intelligence' are all examples of analogically thought concepts that do not attempt to describe the unknown ground of systematicity, but rather give us indispensable rules to investigate nature. This analogical conception finally explains how the idea of God, despite being "removed" from the objects of sense, is not detached from them and must indirectly guide empirical investigation.

Part II

3 Kant's Space of Reason and Science: A Perspectival Reading

1. Introduction: unity, pluralism, and perspectivism

The unity of science thesis ('monism')—the idea that unity plays an important, if not crucial, role in the investigation of nature—has been severely criticized from many quarters in recent decades.[1] Only a small minority of philosophers of science would now defend the once popular metaphysical claim that science is a unified system which is supposed to reflect the unity of nature.[2] Setting here aside metaphysical questions regarding the unity of nature and its correspondence to scientific representations, critics have further argued that unity is not a welcome hypothesis even from a purely *epistemic* point of view. It is on the latter point of view—in particular, with respect to *scientific theorizing*[3]—that I will focus my attention in this chapter.

Dupré, Cartwright, Chang, and many others have in different ways argued that unity is not a desirable epistemic requirement in the actual practice of how most of scientific research is conducted. For instance, Dupré 1996 has argued that theoretical unity is socially and politically undesirable; Chang 2012 that it is such an unreachable requirement that we are better off not looking for unitary theories. Even more radically, it has been argued that such a thesis would detrimentally affect science as it would lead us to privilege systematic considerations over more valuable empirical evidence (see Cartwright 1999). Such accounts are undoubtedly persuasive. It is uncontroversial that the present state of scientific theorizing is characterized by a plurality of models, theories, and classifications, each revealing different aspects of phenomena. Pluralism—the view that phenomena cannot be

[1] Early criticism of the unity of science thesis can be found in Suppes 1978. More recent criticism in Dupré 1996, Cartwright 1999, and Chang 2012, discussed below.
[2] Proponents of this claim include, e.g., Paul Oppenheim and Hilary Putnam; see their paper, "The Unity of Science as a Working Hypothesis" (1958).
[3] I use 'scientific theorizing' to refer to the construction and employment of theories in science, broadly construed.

completely explained by a single theory and, instead, require a plurality of theoretical approaches for their investigation—seems the meta-scientific principle that is best suited to guide scientific research.[4]

There is a plurality of views about scientific pluralisms and the description I offer here is only a primer to a much complex topic. But what all pluralists seem to agree on is that the plurality of approaches that currently characterizes most areas of scientific investigation does not necessarily represent a "deficiency" of science (Kellert et al. 2006, x). A recent and influential account—'perspectivism' or 'perspectival realism' (Rueger 2005, Giere 2006a, Teller 2011, Massimi 2018)—felicitously captures and motivates this aspect of pluralism. Multiple approaches and theories are nothing but different *perspectives* from which we investigate phenomena. Given our epistemic limitations—the point of view we occupy—science is perspectival through and through.

According to Giere's perspectivism, not only is scientific observation perspectival because of the limited sensitivity of the instruments we use (partiality of the input, non-transparency of the instrument), scientific theorizing (from data models to scientific principles) is perspectival too: "Newton's laws characterize the classical mechanical perspective; Maxwell's laws characterize the classical electromagnetic perspective; the Schrödinger Equation characterizes a quantum mechanical perspective" and so on (Giere 2006a, 14). As noted by Massimi, while Giere's perspectivism focuses on historical considerations, other types of perspectivism, like the one advocated by Rueger 2005 and Teller 2011, privilege the cultural situatedness of our knowledge over the historical one (see Massimi 2018, 168–9). As a result, they focus on the synchronic coexistence of different theories rather than on their development over time. While there are significant disanalogies between the two forms of perspectivism, they both share the insight that our epistemic limitations fundamentally condition the possibility of scientific knowledge. In both cases, the plurality of approaches

[4] For the distinction between plurality and pluralism, see Kellert et al. 2006, ix–x.

is not to be regarded as a defect of our knowledge. It is instead the inevitable result of the epistemic situation we occupy.

If we accept that pluralism characterizes the way we need to think about nature, there seems to be no room left for a principle of unity in science. Indeed, as I will show in the next section, most pluralists (within and outside perspectivism) reject monism as a valuable epistemic principle in science. Such rejection, however, raises a number of concerns: Does the acceptance of pluralism inevitably entail the exclusion of unity from a purely epistemic point of view? Is pluralism sufficient as the only epistemic principle guiding scientific research? Isn't it possible to redefine scientific pluralism and monism as non-conflictual principles? In the remainder of this chapter, I will try to address these questions and suggest a reconciling solution. I will first problematize the contemporary understanding of the relation between unity and pluralism in science (Section 2); I will then look at a *perspectival* approach to the problem Kant's presents in the *Critique of Pure Reason* (Section 3); finally, I will try to explain how Kant's perspectivism might inspire the current debate (Section 4).

2. Unity vs. pluralism: an 'antinomy' that awaits a solution?

The debate between pluralism and unity I briefly introduced in the previous section seems to present us with two mutually exclusive epistemic principles. Scientific research should be guided *either* by a pluralistic principle *or* by a postulated unity of scientific cognition. Since pluralism has proven to be empirically more suited to scientific research, one should fully endorse it and reject monism. I contend that such incompatibility is not the inevitable upshot of two contradictory principles. Rather, it results from a misleading characterization of these very principles. As I will argue, pluralism and monism can and, indeed, must coexist and complement each other in scientific research.

Let's first try to better qualify the conflict between pluralism and monism in the current debate. As previously mentioned, pluralism comes in different varieties. I will here focus on the variety of pluralism proposed by

Kellert, Longino, and Waters in their programmatic volume on scientific pluralism, namely “empirical pluralism,” or the “pluralist stance” (Kellert et al. 2006, xiii). This version of pluralism is meant to avoid the limits of weaker and stronger formulations of pluralism, while remaining representative of most pluralist takes. Empirical pluralism amounts to a “commitment to avoid reliance on monist assumptions in interpretation or evaluation coupled with an openness to the ineliminability of multiplicity in some scientific contexts” (ibid.). With respect to scientific theorizing, this definition implies: i. (negatively) that an empirical pluralist should not rely on any monist assumption while elaborating scientific theories; and ii. (positively) that an empirical pluralist is open to the possibility of a persistent multiplicity of incompatible, yet explanatory, theories describing phenomena.

As can be seen, the incompatibility with monism is built into the very definition of empirical pluralism. But what kind of monism should a pluralist avoid? As Kellert, Longino, and Waters put it, scientific monism is the view that “the ultimate aim of a science is to establish a single, complete, and comprehensive account of the natural world” (ibid., x). Crucially, scientific monism assumes that “the nature of the world is such that it can, at least in principle, be completely described or explained by such an account” (ibid.). Scientific monism is therefore defined as a metaphysical thesis about the *nature* of the world. Pluralists do not, however, support the opposite metaphysical claim. Instead, they argue that whether such theories might be unified is an “open, empirical question” (ibid.). I side with pluralists in thinking that unity cannot be simply stated as a metaphysical truth about the nature of the world. But I want to problematize the resulting rejection of monism as such. If we rule out unity as a metaphysical truth, does this mean that it cannot still play an important role from an epistemic point of view?

I suggest that empirical pluralism, as the sole epistemic principle guiding scientific research, is, at the same time, both too strong and too weak a requirement. It is too strong for it does not fully account for the process of unification existing in science: history provides us with brilliant cases of theory unification (Einstein’s special theory of relativity is paradigmatic in this

sense) and there are fields, like fundamental physics, in which unification still plays a significant and programmatic function (e.g., in the quest for a theory of 'everything' that unifies the four fundamental forces). It is true that pluralists do not deny the possibility of unification—they treat it as an open question—, but the process of theory unification remains epistemically unexplained. If we commit ourselves to avoid monist assumptions, how could we even attempt to unify theories in the first place? The empirical pluralist's reply that evidence should guide us is clearly ill-equipped to provide a satisfactory answer. Empirical evidence is exactly what prompts pluralism, and it is unclear how it can lead us to unificatory hypotheses without relying on a different set of assumptions. Indeed, theory unification is rarely possible on experimental grounds alone—the construction of the electroweak theory being a clear example of such evidential insufficiency for unification.[5]

Furthermore, a pluralistic programme which is merely satisfied with a plurality of approaches and strategies seems also too weak a principle. For it does not really address the question of how scientific research *ought* to be done. Shall we regard the multiple approaches and theories presently available as the definitive ones? Or shall we look for ever finer-grained descriptions and explanations? An empirical principle of pluralism leaves us with no definite answer to such concerns. Indeed, since it rests content with any given plurality of theories, it seems insufficient to express the very pluralistic urge that motivates it.

Some pluralists have come to explore the possibility of complementing pluralism with some weaker—metaphysically uncommitted—forms of monism. Giere's perspectivism is emblematic in this respect. Although perspectivism is the pluralistic view that there is a plurality of legitimate historically (or culturally) motivated perspectives on phenomena, Giere recognizes that there are cases in which it is indeed recommendable to unify perspectives into larger points of view. What we need to do is not to introduce a metaphysical doctrine of the unity of the world. We need instead to complement perspectivism with a mere "methodological presumption,"

[5] See, e.g., Morrison 2008, 49.

according to which “we presume there is a unique causal structure to the world” (Giere 2006a, 34; see also 2006b, 36). Importantly, this should not be regarded as a necessary requirement of our reasoning: it is an additional desideratum of our scientific practice that might lead us to further unifications. As Giere puts it:

> From a perspectival point of view, one need not be too upset with the current situation in theoretical physics. Good theoretical science does not require finding genuinely universal principles. Well-fitting models, based on a variety of principles, are good enough. And, indeed, that is all that can be found across most of the sciences. (Giere 2006b, 33)

The picture here suggested is of a self-sufficient epistemic principle of pluralism that may be complemented by a principle of unity at a higher level of inquiry. In other words, the two epistemic principles are compatible at different levels: while pluralism is necessary for scientific research *as such*, monism might turn out to be a useful methodological maxim when it comes to particularly ambitious scientific projects. I will argue, however, that the compatibility between pluralism and monism does not merely concern the possibility of further unification in science. Further unification is, as it were, the tip of the iceberg of a larger problem. Unification, I suggest, is an on-going process that is ubiquitous at any level of science and is implied even at the level of the pluralistic image of models.

The self-sufficiency of pluralism, even at the ‘basic’ level of science, is indeed questionable. Take two standard examples of ‘perspectives’ in the history of science: Newton’s theory of motion and Maxwell’s theory of electromagnetism. It is difficult not to see these two perspectives as *themselves* instances of unification. Newton’s theory famously unified celestial and terrestrial mechanics. Maxwell’s theory brought together electromagnetism and optics. Both theories (despite being ultimately incompatible) showed that different phenomena can be successfully unified with each other. More generally, to do without a principle of unity at the basic level of science would be to discourage the very process of theory construction, namely the hypothetical subsumption of different phenomena

under general, abstract principles. To quote Giere's own example, it would require "something like concluding that different samples of the same radioactive isotope had different half-lives and that no further explanation of this difference was possible" (Giere 2006a, 34–5). This example clearly goes a bit further than showing that a mere desideratum of unity might be added to a self-sufficient principle of pluralism. It seems to suggest, instead, that unification—as a methodological rule—is an epistemic principle that necessarily complements pluralism even at the basic level of scientific inquiry.

There seems to be no contemporary account that offers promising solutions to this debate. But following Kitcher 1999 and Breitenbach and Choi 2017, I submit that a solution can be inspired by Kant's account of theoretical reason in scientific cognition. Rather than presenting a loosely Kantian-inspired interpretation of the role of unity in science, however, I will look into Kant's text to see whether it directly offers arguments that may be used in the current debate.[6] Crucially, although Kant is generally presented as a strong advocate of the unity of science thesis, I will argue that Kant's conception of systematic unity contains—perhaps surprisingly—compelling remarks on the compatibility between unification and pluralism in the space of reason. "Insightful men"—Kant notes at the end of the first part of the Appendix to the Transcendental Dialectic— are "in conflict with one another" as to whether they should follow a "maxim of the manifoldness of nature" or the one "of the unity of nature" in empirical investigations (A667/B695). As I will explain, the incompatibility between these two maxims results from an apparent 'antinomy' of reason: the antinomy, however, soon disappears as we recognize the principles that ground the maxims as regulative principles

[6] Kitcher presents a Kantian-inspired 'modest unificationism' that tolerates multiple accounts, but still aims to reduce their number. Inspired by Kant's notion of systematic unity, Breitenbach and Choi 2017 make a convincing case that the unavoidable plurality of accounts should not discourage our attempt to integrate them in a unified system. While my paper greatly benefits from both these contributions, I will present Kant's systematic unity not merely as an ideal of unification but as a conceptual space that results from both unification and pluralism.

rather than opposed objective insights. As such, Kant says, “these maxims can of course be united” (ibid.).

In particular, I suggest that an interesting variation on perspectivism can be found in Kant’s conception of reason.[7] While standard perspectivism focuses on the plurality of observational points of view, Kant’s ‘perspectivism’ privileges the common space within which different perspectives can be taken up. Kant’s space of reason is a place where plurality and unity can and indeed must coexist with each other as principles, or ‘axes,’ that are both essential to scientific theorizing. In the following section, I will elaborate on what I take to be the three crucial features of Kant’s perspectivism (i. ideas as *foci imaginarii*; ii. plurality of points of view; iii. the unified space of reason). In the final section, after some clarification on the difference between Kant’s treatment of the problem and the contemporary debate, I will explain how Kant’s perspectivism might enlighten the discussion.

3. Kant’s perspectival space of reason

3.1 The regulative function of reason

Kant addresses the problem of the systematic unity of our empirical cognition in the very much debated Appendix to the Transcendental Dialectic in the *Critique of Pure Reason*.[8] In the Appendix Kant finally presents the long-promised positive use of reason and its ideas. Ideas are “deceptive” and “transcendent” when they are mistaken for “concepts of real things” (A643/B671). The Transcendental Dialectic shows that when we treat mere ideas as such—when, for example, we treat the idea of God as that of an object and we even attempt to demonstrate its existence—reason inevitably oversteps the boundaries of possible experience. Ideas, however, do retain a “good” and “*immanent*” use when directed not toward objects, but towards the faculty that, in Kant’s architectonic, directly has to do with objects, namely

[7] A similar proposal (with respect to realism in science) can be found in Massimi 2017a, forthcoming. This paper is, however, non-committal to the realism of scientific theories and focuses instead on the epistemic features of perspectivism.
[8] Particularly in its first part (A642/B670–A668/B696).

the faculty of the understanding, or the faculty of concepts (see A126). Reason, in its positive use, is therefore presented as a second-order faculty. While the understanding has to do with objects, reason, as Kant puts it, "does not *create* any concepts (of objects) but only *orders* them and gives them that unity which they can have in their greatest possible extension, i.e., in relation to the totality of the series" (A643/B671). As a result, in Kant's terminology, the employment of reason cannot be *constitutive* as that of the understanding. The concepts of the understanding constitute the objects of experience, but reason, as we saw, is further removed from objects. Reason maintains, however, an important *regulative* function: that of guiding the activity of the understanding by ordering its particular concepts.

From these two closely related features of reason (its being a second-order faculty and having a regulative use) it would seem that its contribution to empirical cognition is a useful tool, or, at best a welcome desideratum.[9] Kant's point would be similar to that of those pluralists who are willing to concede some role to unification in science. Although pluralism has proven to be efficacious in most cases, we might keep a methodological principle in favour of unity. Good science—they argue—does not require unity, yet we might desire or even look for higher forms of unification in some specific cases. A weak principle of unity is all that pluralist science may at best need. However, I contend that this is not a good depiction of Kant's position, and further, that Kant has good reasons to think about unity and pluralism in a different way. Reasons that—as I will show in the last section—can be applied to the current debate (with some caveats). Importantly, Kant characterizes the regulative use of reason not just as desirable or useful, but as "an excellent and indispensably necessary" one (A644/B672). As emphasized by Massimi, this indispensably necessary use is clearly presented in 'perspectival' (and 'optical') terms (see Massimi 2017a, forthcoming). Let's take a closer look at the Appendix in order to understand

[9] E.g., Guyer 1990 has famously argued for this position: "systematicity is not a factor which enters into understanding's constitution of empirical knowledge itself, but only an additional desideratum which reason seeks to find or construct in the empirical knowledge produced by understanding" (28).

what kind of perspectivism is here at stake. I contend that Kant's perspectivism is best described by the following three main features.

3.2 First perspectival feature: ideas as foci imaginarii

The first perspectival feature of Kant's account of reason has already attracted considerable attention in the literature. Kant presents the necessary function of ideas of reason in clear optical terms. Drawing upon optical treatises of his time, Kant defines the ideas of reason as *foci imaginarii* (imaginary standpoints) for the rules of the understanding.

> [Transcendental ideas] have an excellent and indispensably necessary regulative use, namely that of directing the understanding to a certain goal respecting which the lines of direction of all its rules converge at one point, which, although it is only an idea (*focus imaginarius*)—i.e., a point from which the concepts of the understanding do not really proceed, since it lies entirely outside the bounds of possible experience—nonetheless still serves to obtain for these concepts the greatest unity alongside the greatest extension. (A644/B672)

In describing ideas as imaginary standpoints, Kant is presumably referring to the VIII axiom of the first book of Newton's *Opticks* (1st edition 1704).[10] It is worth comparing the Kantian example with its source.

[10] See, e.g., Grier 2001, 37, and Allison 2004, 425. Massimi forthcoming notes that Kant does not mention Newton in the *Appendix* nor in the *Dreams of a Spirit-Seer* (1766) where the metaphor appears for the first time. She then argues that Kant's source is actually Descartes's *Treatise on Man* (which Kant did mention in 1766). While it is plausible that Kant inherited the metaphor from Descartes, I also maintain that Kant was at least partly inspired by Newton's *Opticks*. In the *Dreams*, just after mentioning the *focus imaginarius* for the first time, Kant explains this analogy by using the example of an object reflected by a concave mirror—interestingly, the same image appears in the second part of the VIII axiom (see Newton 1952, 19, and *Dreams*, 2:344). Furthermore, as I will argue below, the 'optical illusion' Kant is talking about perfectly matches Newton's description of the illusion occurring when an object is reflected by a mirror.

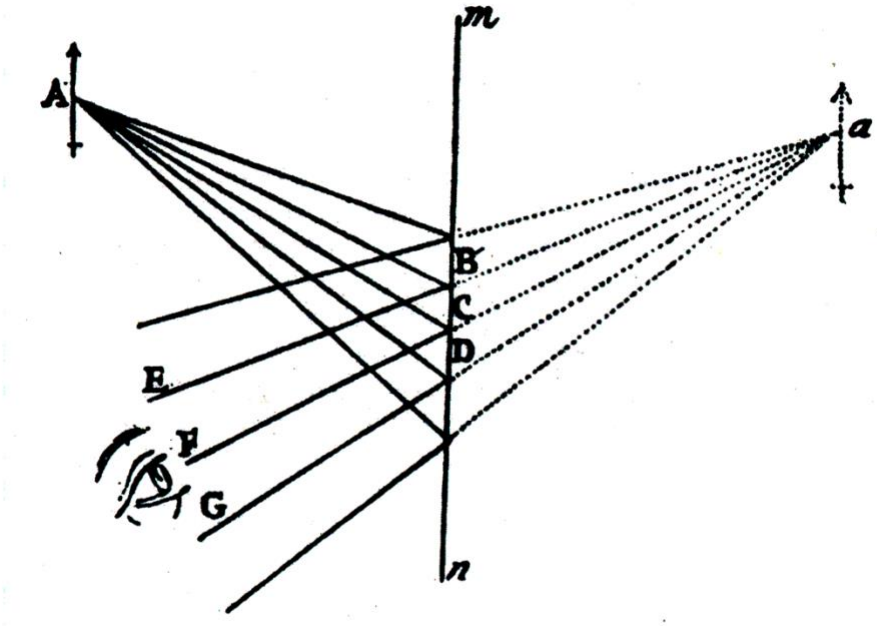

Figure 1. Illustration of the VIII Axiom, from Newton's *Opticks* (4th edition, 1730)[11]

According to the VIII axiom, an object (A) reflected by a mirror (*mn*) appears to be in the place (a) from where all the rays diverge towards the observer.[12] As the focal point (a) unifies all reflected lines and guides the eyes of the observer, ideas of reason unify the manifold of concepts and guide the understanding. Kant illustrates this use of reason with a number of examples taken from a variety of scientific disciplines: chemistry ("*pure earth*," "*pure water*," and "*pure air*"; A646/B674), psychology ("*fundamental power*"; A649/B677), astronomy (planetary motion; A663/B691), physics ("gravitation"; A663/B691), and biology ("hereditary distinctions between families"; A667/B695). In each of these cases, reason projects an idea in

[11] Reprinted in Newton 1952. Permission to reproduce the image granted by Dover Publications.

[12] "AX. VIII. An Object seen by Reflexion or Refraction, appears in that place from whence the Rays after their last Reflexion or Refraction diverge in falling on the Spectator's Eye. If the Object A be seen by Reflexion of a Looking-glass *mn*, it shall appear, not in its proper place A, but behind the Glass at *a*, from whence any Rays AB, AC, AD, which flow from one and the same Point of the Object, do after their Reflexion made in the Points B, C, D, diverge in going from the Glass to E, F, G, where they are incident on the Spectator's Eyes. For these Rays do make the same Picture in the bottom of the Eyes as if they had come from the Object really placed at *a* without the Interposition of the Looking-glass; and all Vision is made according to the place and shape of that Picture" (Newton 1952, 18).

order to bestow unity upon the particular cognitions of the understanding. In projecting ideas, however, reason runs the risk of taking them as concepts of real objects. But as we saw, ideas cannot be regarded as concepts of objects. As Kant explains:

> Now of course it is from this that there arises the *deception*, as if these lines of direction were shot out from an object lying outside the field of possible empirical cognition (just as objects are seen behind the surface of a mirror); yet *this illusion (which can be prevented from deceiving) is nevertheless indispensably necessary if besides the objects before our eyes we want to see those that lie far in the background*, i.e., when, in our case, the understanding wants to go beyond every given experience (beyond this part of the whole of possible experience), and hence wants to take the measure of its greatest possible and uttermost extension. (A644–5/B672–3; my emphases)

What is the optical "illusion" Kant is referring to? Newton's axiom may help us answering this question. The object (*A*), which is placed behind the observer (and thus outside her visual field), appears to be in front of her (that is "behind the surface of a mirror"; *mn*), in the place *a*. The illusion is thus created by the fact that the reflected image is almost identical to the vision we would have if *A* were really placed in *a*.[13] This seems to be exactly the optical phenomenon Kant uses in order to explain the ideal 'vision.' The rays between *mn* and *a* represent the illusion that enables the observer to extend the visual field from the space between her and the mirror (given experience: *EB*, *FC*, *GD*) to the space between the mirror and *A* (possible experience: *AB*, *AC*, *AD*). The illusion deceives the observer when she mistakes what is merely a focal point (*a*; an idea) for a real object (*A*; an actual object).[14] By doing so, she turns a mere regulative principle into an unwarranted metaphysical principle. Reason, however, can fully recognize the nature of ideas as projections and use them to orient the concepts of the understanding. It thereby becomes critical: it can eliminate the error and legitimately hope to extend its visual field.

[13] The image is still reversed in the direction perpendicular to the mirror surface.
[14] This positive 'illusion,' as it were, is not really illusory or deceitful. As such, it must be distinguished from 'transcendental illusion.' I discuss this distinction in Chapter 1.

Let's take stock here. While the perspectival nature of the ideas of reason as focal points should be clearer now, the status of necessity attached to them may still raise some perplexity. For Kant seems to formulate such necessity in hypothetical terms: we need to employ ideas only if we want to go *beyond given experience* and attain the greatest unity of cognition. Does this mean that the regulative function of ideas is a mere additional desideratum of science? In other words, are ideas 'necessary' only when we look for 'higher' unifications? I contend that this is not the case. Indeed, Kant presents this use of reason as *hypothetical*—but it would be a mistake to read it as a mere afterthought of scientific inquiry. Kant says:

> If reason is the faculty of deriving the particular from the universal, then: Either the universal is *in itself certain* and given, and only *judgment* is required for subsuming, and the particular is necessarily determined through it. This I call the 'apodictic' use of reason. Or the universal is assumed only *problematically*, and it is a mere idea, the particular being certain while the universality of the rule for this consequent is still a problem; then several particular cases, which are all certain, are tested by the rule, to see if they flow from it, and in the case in which it seems that all the particular cases cited follow from it, then the universality of the rule is inferred, including all subsequent cases, even those that are not given in themselves. This I will call the 'hypothetical' use of reason. (A646–7/B674–5)

Reason can be used either apodictically or hypothetically. In the former case, the universal is given and the particular is determined through it; in the latter, the particular is given but the universality of its rule is only projected as a "problematic concept"—i.e., as an *idea*.[15] Now, to say that the hypothetical use of reason is only necessary for higher unities of empirical cognition would mean to say that at least *some* universal concepts are given to us in experience through concepts of the understanding and empirical intuitions—

[15] Importantly, this does not mean that ideas themselves are to be understood as 'hypotheses' that can be true of nature. If this were the case, ideas would be mistakenly used as concepts *of objects*. Rather, I take Kant to mean that the hypothetical use of ideas is necessary to generate empirical hypotheses. For example, the idea of fundamental power is not itself an empirical hypothesis, but it is necessary to generate the hypothetical, empirical concepts of fundamental powers—what Kant calls 'comparatively fundamental' powers. I criticize the hypothetical reading of ideas in Chapter 1, and I elaborate on how ideas contribute to the formation of empirical concepts in Chapter 4.

in other words, from experience.[16] But can we obtain something like universality or apodictic certainty from experience? Kant is quite clear that this is not the case:

> Empirical concepts, together with that on which they are grounded, empirical intuition, cannot yield any synthetic proposition except one that is also merely empirical, i.e., a proposition of experience; thus it can never contain necessity and absolute universality […] No universally valid, let alone apodictic proposition could ever come from empirical intuition: for experience can never provide anything of this sort. (A47–8/B64–5)

As Kant affirms here and elsewhere, experience can never yield any kind of "necessary and apodictic propositions" (A721/B749) for all empirical cognitions are confronted with the problem of induction. If the universal is never given in experience, then it must be postulated for *any* empirical concept in accordance with the ideas of reason. The Appendix teaches us that we can employ regulative ideas in order to extend the rule that we infer from given particular cases to all possible experience: this use of reason necessarily contributes to the formation of any universal empirical concept.[17] And since scientific cognition has to do with such concepts, it also follows that the regulative use of reason is necessary to transform any given experience into scientific knowledge.

Kant presents the ideas projected by reason in its hypothetical use as perspectival focal points of unity. This function of reason—which Kant later in the text also calls the "logical principle of genera" (A654/B682) or of "homogeneity" (A658/B686)—is regulative, yet indispensable. It is regulative because reason is farther removed from objects and ideas cannot stand for actual things. In other words, it is not a metaphysical principle that constitutes nature as objectively unitary. Nevertheless, reason's principle of unity

[16] It is worth noting that, for Kant, all concepts are universal ("in kind, all concepts are universal and can always hold of other things in a certain way"; see *Vienna*, 24:909. Empirical concepts are no exception. Kant often uses 'empirical concept,' 'common concept' and 'universal concept' interchangeably in his lectures on logic: see, e.g., *Blomberg*, 24:269. In the Appendix, Kant also reminds that "each species is always a concept that contains within itself only what is common to different things" (A655/B683).
[17] See Chapter 4 for a detailed analysis of empirical concepts formation.

necessarily regulates the conceptualization activity of the understanding. In particular, it projects the unity and universality of given particulars, thus enabling the formulation of empirical concepts: an activity which is an integral part of science.

3.3 Second perspectival feature: plurality of points of view

The characterization of ideas as focal points might incline us to think that, for Kant, there is as much science as there is unity. This is, however, only one side of the story. Kant's theory of theoretical reason includes a principle of unity but is not limited to that. As Kant puts it:

> To the logical principle of genera there is opposed another, namely that of *species*, which needs manifoldness and variety in things *despite their agreement under the same genus*, and prescribes to the understanding that it be no less attentive to *variety* than to agreement. This principle (of discrimination, or of the faculty of distinguishing) severely limits the rashness of the first principle (of wit). (A654/B682; my emphases)

The principle of "species" ("*variety*"; A657/B685; or "*specification*"; A658/B686) prescribes to look for variety in things despite their being unified under the same genus. I propose to look at this principle as the second perspectival feature of Kant's theory of reason. While the first feature tells us that ideas are focal points of unification, this second principle limits the first one and prescribes to specify each concept in a plurality of points of view.

If this is correct, I contend that Kant's principle of specification is similar enough to contemporary empirical pluralism to draw an interesting comparison between the respective cases. Recall that empirical pluralism has a negative part (i. avoidance of monist assumptions) and a positive part (ii. admission of plurality of accounts). As concerns i., to follow the principle of specification does imply avoiding monist assumptions. One may take Kant's principle of specification to be subordinated to the principle of unity (as a species is subordinated to its genus). But note that Kant's principle of specification is more radical than that:

> Here reason shows two interests that conflict with each other: on the one side, an interest in the *domain* (universality) in regard to genera, on the other an interest in *content* (determinacy) in respect of the manifoldness of species; for in the first case the understanding thinks much *under* its concepts, while in the second it thinks all the more *in them*. This expresses itself in the very different ways of thinking among students of nature; some of whom (who are chiefly speculative) are hostile to differences in kind, while others (chiefly empirical minds) constantly seek to split nature into so much manifoldness that one would almost have to give up the hope of judging its appearances according to general principles. (A654–5/B682–3)

While unification universalizes the domain of a concept, this second principle tells us to find variety in the content of a concept. Specification does not merely express the subordination of species *under* genera, but it directly opposes to unification inasmuch as it *disunifies* the content of any universal concept. In Kant's words, "chiefly empirical minds" do not simply specify a given unitary concept into species and subspecies, but they "split nature into so much manifoldness that one would almost have to give up the hope of judging its appearances according to general principles." The two principles therefore result in interests that conflict with each other—a conflict that seems very much alive even today.

What about the positive requirement of admitting multiple accounts of phenomena (ii. above)? Here there seems to be a difference for, while Kant's principle results in the specification of particular phenomena, a contemporary pluralist welcomes different *accounts* of phenomena. Let's take a typical example of contemporary pluralism: the concept of species. There are different concepts of species: the biological species concept (based on interbreeding), the phylogenetic species concept (based on ancestry), the ecological species concept (based on ecological niches), etc. Pluralists think there is no best account of 'species' and all these concepts are legitimate representations of particular aspects of the complex 'species' phenomenon. Although Kant's terminology differs from the one used in the contemporary debate, I do not see any reason not to regard this and similar cases as contemporary applications of Kant's principle of specification. After all, different concepts of species are nothing but particular aspects of a complex

phenomenon and ultimately, they are all based on particular phenomena (interbreeding, ancestry, ecological niches, etc.). Empirical pluralists can therefore be seen as contemporary "chiefly empirical minds" who "split nature" as much as possible by replacing unitary concepts with a variety of concepts of particular aspects of phenomena.

There is, however, a lingering worry, namely that the kind of pluralism resulting from Kant's principle of specification may be closer to what is known in the literature as 'modest pluralism' than to a genuinely perspectival take on scientific investigation.[18] According to modest pluralism (of which Mitchell is perhaps the best-known advocate; see, e.g., Mitchell 2003), scientists must indeed engage in a plurality of accounts, but such accounts are meant to contribute to a single, integrated picture of a complex phenomenon. For an empirical pluralist, no such commitment to 'integration' is necessary. On the contrary, different perspectives (for instance, different accounts of species) may be inconsistent with each other and still enhance our understanding of nature. To answer to this worry, it is important to point out that Kant's principle of specification is uncommitted as to whether the 'particulars' resulting from it contribute to an integrated account of a phenomenon. All the principle *does* prescribe is, instead, to indefinitely split nature into more and more particular phenomena. But if this is the case, one may wonder if it still makes sense to talk about an integrated picture of a complex phenomenon rather than just a plurality of particular accounts. Even for a Kantian "empirical mind" then, the investigation of particular phenomena may not contribute to any single, integrated account of a complex phenomenon.

I have suggested that Kant's principle of specification can be read in a way that invites the evolution towards contemporary perspectivism. We should not forget, however, that in Kant's view this principle, exactly as the principle of homogeneity, can be only *regulatively* employed. This has two key implications that I will fully explore in the following section. First, as a regulative principle, specification does not metaphysically assert that nature is an irreducible manifoldness or variety of things. It is instead a regulative

[18] See Kellert et al. 2006, xii–iii. Thanks to Luigi Caranti for pressing me on this point.

principle that is only meant to promote the empirical investigation of nature. As such, it can be made compatible with an equally regulative principle of unity: indeed, the two opposite principles mutually complement each other.[19] Second, as a non-objective principle, it can legitimately prescribe not just plurality of species, but indefinite specification of concepts.

> Reason demands in its entire extension that no species be regarded as in itself the lowest; for since each species is always a concept that contains within itself only what is common to different things, this concept cannot be thoroughly determined, hence it cannot be related to an individual, consequently, it must at every time contain other concepts, i.e., subspecies, under itself. (A655–6/B683–4)

The process of specification can thus be held as indefinite, or potentially infinite.[20] This means that a Kantian "empirical mind" should not be satisfied with a given plurality of concepts of phenomena. Rather, she should constantly seek to further specify and disunify any postulated universal concept.

Kant concludes his account of principles of reason by introducing a third principle—"*continuity*" (A658/B686) or "affinity" (A660/B688)—resulting from the combination of the first two.

> The last arises by uniting the first two, according as one has completed the systematic connection in the idea by ascending to higher genera, as well as descending to lower species; for then all manifolds are akin one to another, because they are all collectively descended, through every degree of extended determination, from a single highest genus. (A658/B686)

The systematic interconnection of concepts according to unity and disunity results in continuity of concepts, or "continuous transition from every species to every other" (ibid.). In other words, reason's combined presuppositions of

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[19] The concepts of genus and species are mutually related, see *Jäsche*, 9:97: "Like higher and lower concepts, *genus* and *species concepts* are distinguished not as to their nature, then, but only in regard to their relation to one another (*termini a quo* or *ad quod*) in logical subordination."

[20] Kant, however, explicitly rejects the Leibnizian idea of "actual infinity" for, he explains, that would determine the conceptual sphere of division. The logical principle of species only asserts the "*indeterminacy*" of conceptual specification (A656/B684).

conceptual unification (leading to a highest genus) and of (potentially) infinite specification give rise to a unified picture in which, as Kant puts it, all different genera are only "partitionings" of as single genus and there cannot be any "leap" between species (A659/B687). Interestingly, Kant illustrates this principle with an example from astronomy: the highly elliptical path of comets. Empirical observation, explains Kant, does not show us their paths in their entirety, yet we guess at a "parabolic course for them since it is still akin to the ellipse and, if the major axis of the latter is very long, it cannot be distinguished from it in all our observations" (A662/B690). We thereby presuppose an affinity of the paths of comets with those of planets. This is only possible on the basis of the combination of the previous principles. In this specific case, as Kant explains, we conceive the "world system" as both "unbounded" (infinitely specified) and "connected through one and the same moving force" (supremely unified) (A663/B691): such a system allows us to presuppose "continuous transition" in the paths of celestial bodies in general. As for the previous principles, continuity should not be read in constitutive terms either. This last principle does not tell us that the world *is* a continuum: no actual continuity, as Kant explains, can be found in experience (see A661/B689). Continuity is instead a regulative principle which, however, is "legitimate and excellent" inasmuch as it "points the way toward systematic unity" (A668/B696).

3.4 Third perspectival feature: the space of reason

I can now elucidate the third perspectival feature of Kant's system of knowledge. We saw that the principle of unity and disunity are *perspectivally* characterized in Kant's theory of reason. The logical principle of unity postulates identity under concepts that allows us to project ideas as *foci imaginarii*. By contrast, the logical principle of variety postulates a potentially infinite specification of concepts that grounds the opposite rational interest of specifying ideas into ever finer-grained parts. Now, I further contend that these two principles (together with the third principle that results from their combination: continuity) make up a perspectival space—Kant's space of

theoretical reason. Within this perspectival space, it is possible to pursue unity as well as disunity of cognition. I will first clarify why I think this is a perspectival feature and then comment on the passages that suggest this interpretation.

Perspectivism is generally presented as the view that that there are different standpoints from which we 'frame' the world. As the term exploits the metaphor of experientially different perspectives, the emphasis is very much on the plurality and potential disagreement among different points of view. It is in this sense that the term 'perspectivism' is generally used in the current debate. But this usage fails to portray another crucial aspect of perspectivism, namely the fact that different perspectives or points of view presuppose—and are only possible within—the same space of representation. It might be instructive to take a brief look at the history of perspective in the arts. Perspective—once a synonym for optics[21]—acquired a specific artistic meaning during the Renaissance when artists and theorists (first and foremost, Brunelleschi and Alberti) started applying optical and geometrical studies to the construction of an artistic representation. The art of perspective subsequently spread as allegedly the most accurate representation of reality. As recognized by several art critics, however, this kind of representation was based on a precise conception of space, namely a perfectly homogeneous, infinite and continuous mathematical space.[22] The assumption of this space is the first logical premise in any perspectival construction.

We can apply this consideration to our present case. As perspectival representations are only possible within a precise system of geometrical assumptions about the topology of space, attempts at conceptual unification and specification of phenomena are only possible within a perspectival system or space of representation. Quite remarkably, Kant says that reason

[21] The Latin word *perspectiva* comes from *perspicere* meaning 'to see clearly.' It thus amounts to a literal translation of the Greek word ***optikḗ***; See Panofsky 1991, 75–6.
[22] See, for example, Panofsky 1991, 31. According to Panofsky perspective is a kind of representation in which "bodies are absorbed into a homogeneous and infinite system of dimensional relationships," that is a "*quantum continuum*" (ibid., 44). Similar remarks are easy to find throughout the secondary literature (see, e.g., Belting 2011).

"prepares the field for the understanding" by presupposing unity, variety, and continuity of concepts (A657/B685). In other words, it presupposes a systematic conceptual framework within which scientific knowledge is possible. Kant goes on to illustrate this 'conceptual space' by using once again specifically perspectival metaphors:

> Systematic unity under the three logical principles can be made palpable in the following way. *One can regard every concept as a point, which, as the standpoint of an observer, has its horizon, i.e., a multiplicity of things that can be represented and surveyed*, *as it were, from it*. *Within this horizon a multiplicity of points must be able to be given to infinity, each of which in turn has its narrower field of view*; i.e., every species contains subspecies in accordance with the principle of specification, and the logical horizon consists only of smaller horizons (subspecies), but not of points that have no domain (individuals). But different horizons, i.e., genera, which are determined from just as many concepts, one can think as drawn out into a *common horizon*, which one can survey collectively from its middle point, which is the higher genus, until finally *the highest genus is the universal and true horizon*, determined from the standpoint of the highest concept and comprehending all manifoldness, as genera, species, and subspecies, under itself. (A658–9/B686–7; my emphases)

As the perspectival space is made up of infinite points, each of which potentially represents a point of view, the logical space of reason is made up of concepts as points. Every concept can be regarded as a viewpoint with its horizon, that is, to quote Kant, "a multiplicity of things that can be represented and surveyed, as it were, from it." This horizon is also a multiplicity of points and each of these points in turn has its own "narrower field of view." On the one hand, conceptual specification is potentially infinite as there is no such a thing as a species which includes only an individual within its horizon.[23] On the other, the presupposition of unity leads us to a highest genus encompassing all concepts that must be presupposed as the "universal and true horizon."

This system of concepts is not, to be sure, how scientific knowledge looks like according to Kant. Indeed, we may never be able to construct such a system. It is, however, the ideal framework according to which empirical

[23] The nature of a concept is such that it can only contain what is common to different things.

cognition can be progressively systematized—that is, unified as well as in(de)finitely divided. It is, as it were, a 'blank' space which leaves the content of experience completely undetermined. Kant specifies that the unity of reason is "in itself *undetermined* in regard to the conditions under which, and the degree to which, the understanding should combine its concepts systematically" (A665/B693). Reason cannot constitute the content of cognition, yet it provides an ordering template of maximal unity and division of concepts—in Kant's word, an "*analogue* of a schema" (A665/B693)—that is necessary for us to transform disparate and particular empirical cognitions into scientific knowledge. In other words, the two principles of theoretical reason (unity and specification) together with the principle that results from their combination (continuity) act as the 'axes' of an ideal conceptual space within which each "student of nature" is able to systematize empirical cognition according to her inclination (A655/B683). Within such a space, as I will argue in the next section, we can reconsider the contemporary principles of unification and pluralism as mutually consistent meta-scientific guidelines.

4. A Kantian solution to the 'antinomy' between pluralism and monism

In this section, I want to elaborate on how Kant's theory of systematic unity might illuminate the contemporary debate on monism and pluralism. Needless to say, Kant's theory is grounded on specific assumptions that might not be shared by contemporary discussants.[24] But even taking into account inevitable disanalogies between Kant's approach and the contemporary status of the debate, one might doubt the very possibility of a comparison between Kant's treatment of scientific rationality and the current debate for at least two reasons. First, Kant seems to take for granted that systematic unity characterizes scientific knowledge—a characterization that seems to beg the very question at stake in the debate. I already suggested that this is not fully accurate. Indeed, Kant defines scientific knowledge as

[24] One, for instance, might question the nature of the Kantian faculties or the conceptual approach to the investigation of nature to begin with.

systematic cognition.[25] But systematic unity is not mere unity, it is a systematic organization of concepts in which unity and plurality play equally important roles and express opposite interests of reason. If this is correct, Kant's systematic unity should not be merely equated with a regulative ideal of unification or integration of multiple accounts. Since we do not know whether nature is really a unity or a plurality, we should not only aim to unify and integrate our theories as much as possible. Rather, we should pursue *both* maximal unity and maximal plurality as epistemic principles leading to systematic cognition.[26]

Second, one might find Kant's taxonomic terminology—'genera', 'species,' 'transition among species'—ill-suited to be used in the contemporary discussion. While we will probably use neither the image of an all-encompassing genus to describe the ideal of unity nor the idea of an indefinitely specified series of species to illustrate the principle of pluralism, it is not difficult to adapt Kant's terminology to the present debate. Kant himself suggests a very broad interpretation of those principles. Not only he equivalently uses more general terms like "identity" or "variety" to describe how the principles of genera and species are supposed to work, he also explicitly specifies that these principles concern "not merely things, but even more the mere properties and powers of thing" (A662/B690). Interestingly, Kant uses the principles of reason to explain how we implement geometrical and mathematical abstractions in modelling phenomena: for instance, we employ the principle of genera to infer the elliptical path of planets, while the principle of continuity is used when "conceiving hyperbolical paths for comets in which these bodies leave our solar system entirely" (A663/B691). These considerations suggest that Kant's principles should be read as meta-

[25] "Systematic unity is that which first makes ordinary cognition into science, i.e., makes a system out of a mere aggregate of it" (A832/B860).
[26] Cf. Breitenbach and Choi 2017 on this point. They argue that "ideal science" may turn out to be a single theory of everything or a "unity constituted of heterogeneous parts"; "we have to wait nature to tell us" (398). Note, however, that empirical pluralism denies that scientists should aim for the integration of heterogeneous accounts (see 3.3). Such alternative may therefore be too 'unificationist' for the empirical pluralist. On my reading, the alternative is not between a single and an integrated unity of nature, but between a unified and a disunified (i.e., non-integrated) account of nature.

scientific norms rather than mere taxonomic guidelines.[27] A principle of genera, for instance, is invoked not only when we classify different species of things under the same genus (say, 'oak' and 'chestnut' under the genus 'Fagaceae'), but also when we presuppose that the same geometrical or mathematical abstraction describes a property of various phenomena.

What are then the advantages of this comparison and the insights in Kant's account of reason we can exploit? In Section 2, I presented the debate over pluralism. I argued that the contemporary discussion implies that pluralism and monism are incompatible principles. Pluralism is generally interpreted as a self-sufficient principle which either excludes any principle of unity or is complemented by a weak form of monism when it comes to the desire of unifying different theories. I already suggested that both solutions are unsatisfactory, for they do not recognize the role unification plays at any level of science—from 'basic' theory formation to 'higher' theories unification. Moreover, an empirical form of pluralism does not fully express the prescriptive urge that motivates pluralism itself. Kant provides us with a useful meta-scientific framework for thinking about these two principles in a new, possibly more promising way. In what I take to be Kant's variation on perspectivism, unity and pluralism do not give rise to an antinomy but are compatible principles that essentially complement each other. I will now show how each of these two principles and their combination can be reconsidered according to the Kantian framework.

4.1 Regulative unity

We saw that contemporary pluralism tends to neglect the significance of a principle of unity in science. Pluralists only admit a principle of plurality, yet they do not go as far as to affirm that unity of nature is impossible. It is an open question, they argue, whether there *is* unity in nature. From this insight, however, it does not follow that unity should not play any epistemic role in science. From a Kantian perspective we can perfectly agree with the claim that we do not know whether nature is actually a unity—indeed, this is why

[27] Guyer 2017, 56–7, makes a similar point.

Kant presents unification as a regulative principle. The rejection of a principle of unity is instead grounded in a misleading characterization of the very same principle. This characterization is parasitic on what Kant would call a metaphysical reading of the principle of unity. According to this reading, the nature of the world is such that can, at least in principle, be fully explained by a single account. In Kantian terms, as we saw, that would mean to be deceived by an 'illusion.' To be guided by a perspectival principle of unity is not to determine the nature of the world. It is, instead, to use ideas in order to universalize what is only particularly given to us in experience. Unity, if thought along the Kantian lines, is only a regulatively employed principle and, as such, can be maintained without posing any threat to a principle of plurality.

The regulative status of the principle should not, however, incline us to consider unity as a mere additional desideratum of science. We saw that some forms of pluralism—most notably, Giere's perspectivism—allow weak forms of unification provided that pluralism remains the only necessary requirement when we do science. I suggested, however, that the exclusion of a principle of unity at the 'basic' level of science poses an additional challenge. For epistemically situated perspectives are themselves instances of unity: Newton's theory of motion, Maxwell's theory of electromagnetism, Einstein's special theory of relativity are all clear examples of perspectives as brilliant unificatory achievements. Although Giere introduces his methodological principle of unity as an anti-Kantian move (Giere 2006b, 36), Kant would not only agree with the need of a principle complementing pluralism, he would also have internal resources to address the above-mentioned challenge.

In Kant's perspectivism, unity does not merely play an auxiliary function but is an integral part of the formation of a perspective—each perspective results from an ideal projection and is itself a form of theoretical unity. Furthermore, we saw that the presupposition of identity has not merely a taxonomic import but is equally employed in geometrical and mathematical representations of phenomena. This different kind of perspectivism can

therefore inspire an integration of unity into the perspectival picture we are familiar with. If we look at how scientific theorizing works across different perspectives, unification indeed plays an important role. Scientific theories typically contain general and abstract principles that are supposed to *unify* seemingly different cognitions of phenomena and properties of phenomena. As Morrison has shown, this is commonly obtained through the mathematical elaboration of general and abstract frameworks. Such frameworks usually contain "a theoretical parameter, quantity or concept that 'represents' the unifying mechanism—that is, a parameter that functions as the necessary piece of theoretical structure that either facilitates or represents the unification of distinct phenomena" (Morrison 2000, 4). In Maxwell's electrodynamics, for instance, this theoretical unifier is represented by electric displacement together with the Lagrangian formalism.

Granted that unification plays a role in the process of scientific theorizing, one might still ask *why* that is the case. In other words, what is precisely the epistemic function of unification? The answer that unifying our cognitions of phenomena affords a deeper understanding of them is intuitively appealing but needs further clarification. Kitcher and Friedman have proposed influential epistemological models according to which unification is essential to scientific explanation.[28] To put it in Friedman's word, "science increases our understanding of the world by reducing the total number of independent phenomena that we have to accept as ultimate or given. A world with fewer independent phenomena is, other things equal, more comprehensible than one with more" (Friedman 1974, 15). Despite their plausibility, these models have been faced with a plethora of objections in the last decades. Convincing counterexamples suggest a more cautious distinction between unification and explanation. For example, it has been shown that in some cases unification provides us with little or no explanation—a possible example being the derivation of Mendelian rules of inheritance within molecular cell biology: even if possible, such a derivation

[28] See, in particular, Friedman 1974 and Kitcher 1981.

would not enhance our understanding.[29] More generally, it is commonplace in contemporary science to obtain a deeper understanding of phenomena by pursuing disunity rather than unity at the explanatory level.

The need to problematize the relation between unification and explanation, however, does not undermine the explanatory value of unifying cognitions and theories. Newton's mechanics, Maxwell's electrodynamics, Einstein's special relativity all successfully explain phenomena by recognizing them as instances of general principles.[30] The challenge is rather to understand why there is no simple identification between unity and explanation. This—I argue—is perfectly understandable from the Kantian approach here suggested. It is true that Kant's principle of unification follows a model of explanation in which the universal explains the particular. But crucially, unity is only a *regulative idea* that neither determines the content of cognition nor gives us any assurance that our attempts will succeed. Such an idea only *prescribes* to search, for any given cognitions, for higher explanatory principles.[31] Scientists might simply not find truly explanatory universal principles, and, as we saw, universals are only hypothetically postulated—therefore, revisable through further empirical evidence.

As a result, our epistemic necessity to presuppose unity in order to elaborate general principles is compatible with the admission of a gap between unification and explanation. Indeed, given that unity does not commit us to a metaphysical thesis of unity nor to the realizability of a unified system, we have no reason to expect this relation to be otherwise. Explanatory unification may simply be out of reach and we may be better off relying on a plurality of explanations as in the case of non-derivation of Mendelian rules within molecular cell biology. Even when available, theoretical unities should be best understood as "starting points" for further explanation: one might, for instance, argue that Einstein's general relativity offers a better understanding of gravitation than Newton's mechanics (see

[29] Example taken from Kitcher 1999, 337.
[30] For a discussion of how theory unification does not necessarily imply loss of explanation, see Rueger 2005.
[31] See my discussion of the prescriptive value of reason in Chapter 1. See also Willaschek 2018, 66–7.

Morrison 2000, 33). In neither case, however, is unity undermined as an explanatory valuable idea that scientists should strive to realize as much as possible—from 'basic' theory construction to ambitious theories unification.

4.2 Regulative pluralism

Since regulative unity does not posit the existence of a unity of nature, nothing prevents us from also embracing a principle of plurality. Importantly, the use of this principle should not be interpreted in constitutive terms either. The principle of specification does not correspond to the metaphysical assertion that nature is an infinite and irreducible variety or manifoldness. Nor is it the mere epistemic satisfaction with a given plurality of models and theories. As we saw, an unqualified form of pluralism does not fully portray the motivation behind pluralism itself—it is too weak a principle. Regulative pluralism amounts instead to the presupposition of a maximally specifiable system of concepts describing phenomena. While following this principle, scientists are not simply satisfied with a plurality of 'local' unities as empirical pluralists seem to suggest. Scientists are instead interested in the progressive, indefinite diversification of phenomena according to ever finer-grained perspectives.

As mentioned in the previous subsection, the explanatory role of pluralism can be as beneficial as that of unification. Since the current system of knowledge is incomplete and hypothetical, unified explanations may be unavailable or too general to be explanatorily satisfactory. This is why it is not uncommon to find disunity at the level of explanation in many fields of contemporary science. We can generalise from this fact. Given that unification is an on-going process that does not metaphysically reduce particulars to universals, we necessarily need to rely on specific theories to explain particular phenomena or particular aspects of phenomena. To regulatively presuppose pluralism of cognition amounts to the demand to seek for ever more specific theoretical approaches. And such prescription allows us to account for the explanations of phenomena that unified theories are not able to provide us with.

Thinking about unity and pluralism in regulative terms finally answers our initial question on the apparent incompatibility between these two principles in contemporary debates. As Kant argues, an antinomy is taking place between unity and pluralism only when these principles are interpreted as "constitutive" or "objective" principles:

> If merely regulative principles are considered as constitutive, then as objective principles they can be in conflict; but if one considers them merely as *maxims*, *then it is not a true conflict, but it is merely a different interest of reason that causes a divorce between ways of thinking* […] In this way the interest in *manifoldness* (in accordance with the principle of specification) might hold more for *this* sophistical reasoner, while *unity* (in accordance with the principle of aggregation) holds more for that one. *Each of them believes that his judgment comes from insight into the object*, and yet he grounds it solely on the greater or lesser attachment to one of the two principles, neither of which rests on any objective grounds, but only on the interest of reason, and that could better be called 'maxims' than 'principles.' (A666–7/B694–5; my emphasis)

As soon as we stop regarding these principles as insights into the nature of objects, the antinomy between them disappears. We are left instead with different "maxims" that, although in conflict with each other, can be reunited as compatible "ways of thinking" in the larger framework of reason. One reasoner may be inclined towards finding unity in nature; another may instead be interested in empirical variety. Although each of them *believes* that her judgment is objectively motivated—that is, constitutive of nature—their conflict does not result from rational incompatibility. It only regards their "attachment to one of the two principles." I contend that the present debate on pluralism and unity presents us with a similar 'antinomy.' Monism and pluralism are both legitimate and compatible 'axes' of the same conceptual space of scientific thinking. Conflicts arise only when at least one of these two principles is held as an objective insight. Classic metaphysical monism holds unity as an objective truth about the natural world. Empirical pluralism does not fare better than the classic view for it recognizes unity *only* as an objective claim about the world and rejects it altogether. These judgements, however, are mistaken about the very rationale of these two principles. As

we saw, both principles, if regulatively employed, are needed to successfully promote the scientific investigation of nature.

4.3 The space of theoretical reason

The resolution of the antimony, however, still leaves us with a lingering problem. For if monism and pluralism are regarded as compatible subjective maxims, we seem to have lost the necessary status Kant also attaches to these epistemic principles. Indeed, several interpretations have been misled by Kant's terminology and suggest a weak reading of the principles of reason as mere maxims.[32] As we saw, however, unity and pluralism are not just welcome epistemic rules, they are necessary, meta-scientific principles. Together they make up a perspectival space in which scientific knowledge is possible. Are scientific maxims compatible with Kant's overall picture? And if this is the case, how can this inspire the contemporary debate? First, Kant's language should not mislead us. The previous passage seems to suggest that objective principles should be replaced by merely subjective, individual maxims. In this way, an antinomy turns out to be a mere conflict between opposed interests. This is correct as far as it goes. However, Kant clarifies:

> Reason has in fact only a single unified interest, and the conflict between its maxims is only a variation and a reciprocal limitation of the methods satisfying this interest (A666/B694).

I take reason's "single unified interest" to mean the systematization of empirical knowledge that results from the combination of the principles of reason.[33] Maxims are not mere synonyms for the "indispensably necessary" regulative principles as the previous passage may seem to suggest. Instead, they only express the individual attachment each scientist has to one principle rather than to the other. They are therefore merely alternative, yet compatible "methods" and together satisfy the only real interest of reason, namely the construction of the system of knowledge. If this is correct, the fact that scientists may be individually interested in following just one maxim does

[32] See, e.g., Guyer and Walker 1990, 227–8, and Pickering 2011.
[33] For a similar suggestion, see Watkins 2017, 26.

not undermine the necessity of both unity and disunity as epistemic principles. Although each principle can be isolated as a maxim, systematic unity requires the presupposition of both unity and plurality of cognition for its construction. These principles make up the conceptual space *within* which any individual attempt to maximize either unity or disunity of cognition is possible.

We can finally apply this insight to the contemporary debate. Pluralism and unification should not be regarded as merely compatible methodological maxims. 'Pluralists' are more interested in empirical variety and privilege the axis of plurality; 'monists' are more inclined towards rational unity and therefore pursue unification of cognition. Despite individual conflicts of interests, however, they ultimately share the same meta-scientific conceptual space of investigation. Perspectivism can therefore be reconsidered not just as the place of conflict among perspectives nor as a form of pluralism opposed to monism, but as the common space where different perspectives can always be further unified and disunified. The space of theoretical reason does not, to be sure, prescribe or determine the content of phenomena. Yet, it provides scientists with a template of maximal systematicity of knowledge which grounds the possibility of different, compatible perspectives—either aimed at unity or at disunity of scientific cognition.

5. Conclusion

I suggested that the current conflict between pluralism and monism is based on a misrepresentation of those epistemic principles. The conflict ultimately resides in a metaphysical characterization of unity in science that does not fully capture the epistemic significance of monism in scientific theorizing. Looking at Kant's perspectivism in the *Critique of Pure Reason* not only allows us to resolve this apparent antinomy, but also to rethink unity and pluralism as necessary regulative principles. These principles together make up a meta-scientific space of reason, within which each scientist can follow her inclination towards unity or disunity of cognition.

There are several important issues this chapter leaves open. Let me conclude by mentioning one which is particularly pressing. I focused on the epistemic function of unity and pluralism within a perspectival framework. I therefore bracketed the question of whether perspectivism may deliver a form of truth in science (and if so, what kind of truth). To investigate this issue from a Kantian perspective would require looking more closely at the transition from logical to transcendental principles of systematic unity Kant presents in the Appendix. Kant has a fairly complex story regarding whether and how this transition might be justified. I will reconstruct and interpret this story in the following Chapter.

4 The Systematic Unity of Reason and Empirical Truth

1. Introduction

There have long been questions about how to understand the relations between faculties in Kant's *Critique of Pure Reason*. The debate between conceptualist and nonconceptualist readings of Kant, in particular, has been focusing on the relation between sensibility and the understanding in the production of perceptual experience. There is, however, another important relation that has been far less studied in the literature: the relation between the understanding and reason. In this chapter, I will show that reason plays a key and underappreciated role in allowing the understanding to obtain empirical cognition and, in particular, empirical truth. Investigating this role can therefore deepen our understanding of the relations between faculties in the *First Critique* and of Kant's critical project as a whole.[1]

Kant introduces reason and its principles of systematic unity (often referred to in the secondary literature as reason's systematicity) in the first part of the Appendix to the Transcendental Dialectic. After severely delimiting the function of reason in the course of the Dialectic, this is one of the few sections in which Kant finally seems to speak of this faculty in positive terms. In the Appendix, Kant examines how reason relates to the understanding not only by limiting its use, but also by giving direction to it and unifying its cognitions. Moreover, he unequivocally characterizes this positive use as "indispensably necessary" (A644/B672) as well as based on "transcendental principles" (A651/B679–A663/B691).

[1] As is well known, Kant's discussion of systematic unity in the *First Critique* has a close relation to the treatment of reflective judgment and the principle of purposiveness in the *Critique of the Power of Judgment*. In this chapter, I will not thematize this complex and enigmatic relation. However, I will highlight several features of Kant's discussion of the possibility of empirical cognition in the *First Critique* that surprisingly anticipate key passages of the Introductions to the *Third Critique*. My reading of systematic unity can therefore help understand Kant's later position as a refinement rather than a complete revision of his previous position (cf. Guyer 1990). For a detailed discussion of the relation between reason's systematicity and reflective judgment, see Zuckert 2007.

The positive contribution of reason is, however, far from being clearly spelled out. The details of Kant's account of reason are so controversial that some commentators have even charged Kant with self-contradiction, starting from Kemp Smith's influential reading (Kemp Smith 1962, 543–52). Most readings of the Appendix, however, can be characterized as methodological interpretations.[2] According to McFarland 1970, Guyer 1990, Pickering 2011, and Willaschek 2018, among several others,[3] Kant's text is minimally interpreted as follows: the systematic use of reason is indeed essential for us, but only if our aim, for scientific or classificatory reasons, is to take our empirical cognition to its greatest extension. The core of this interpretation, as Geiger suggests, is that some basic empirical knowledge of nature is possible without reason's systematicity (see Geiger 2003, 279). Strictly speaking, therefore, reason is neither "indispensably necessary," as Kant claims it is,[4] nor a transcendental condition of empirical cognition, but it acts as an important guideline for extending our knowledge.

To date there has been a more limited literature opposing this view. Walker 1990, Abela 2002, Geiger 2003, Allison 2004, and Mudd 2017 have in different ways proposed more radical interpretations which try to vindicate the systematicity of reason not just as an additional desideratum that extends our knowledge, but as a transcendental principle of experience.[5] Note that to say that systematic unity is a transcendental principle does not plausibly mean that it is a condition of the very possibility of experience, or experience as such (like e.g. the categories of the understanding), but that is a necessary and indispensable condition of experience as giving rise to

[2] This characterization is used both by Abela 2002 and Geiger 2003.
[3] E.g., Kitcher 1986, Wartenberg 1996, Grier 2001.
[4] Massimi has recently drawn attention to this aspect. On her account, even the interpretations according to which the illusion of reason motivates the understanding and allows us to conceive of ideal illusory objects (such as Grier 2001) do not make full justice to Kant's text: for this ability "might at best be useful, instrumental, desirable; but not indispensable" (Massimi 2017a, 70).
[5] Other approaches that take seriously the transcendental status of the principles of reason, without however clearly presenting them as conditions of experience, include Buchdahl 1992, Neiman 1994, Ypi 2017, and Massimi 2017a. Guyer 2017 and Breitenbach 2018 also offer strong interpretations of reason, although in close connection with the specific problem of empirical laws of nature which I cannot discuss in this chapter (for a discussion of the role of reason with respect to empirical laws of nature, see Chapter 5).

empirical cognition. Despite being supported by several passages of the Appendix, this reading has the disadvantage of being not easily reconcilable with the Transcendental Analytic in which Kant seems to leave no room for a transcendental function of reason.[6]

These interpretative problems are clearly exemplified when trying to understand the particular aspect of reason that represents the main concern of this chapter: namely, the fact that reason's systematic unity is repeatedly presented as a criterion of empirical truth. Take the following passages from the Appendix:

> The hypothetical use of reason is therefore directed at the systematic unity of the understanding's cognitions, which, however, is the *touchstone of truth* (*Probierstein der Wahrheit*) for its rules. (A647/B675)

> For the law of reason to seek unity is necessary, since without it we would have no reason, and without that, no coherent use of the understanding, and, lacking that, *no sufficient mark of empirical truth*; thus in regard to the latter we simply have to presuppose the systematic unity of nature as objectively valid and necessary. (A651/B679; emphasis added)

> The systematic connection that reason can give to the empirical use of the understanding furthers not only its extension but also guarantees its *correctness* (*Richtigkeit*). (A680/B707; emphasis added)

In these passages, Kant links the employment of reason not only to the extension of our empirical knowledge, but also to its truth and correctness. As a result, it is hard to reconcile them with any methodological interpretation. If reason only provides us with a method to extend our already

[6] Several affinities can be found between the present discussion and the debate about Kant's conceptualism vs. Kant's nonconceptualism. The former concerns the role of reason in the production of empirical cognition, whereas the latter focuses on the role of sensibility and understanding in producing perceptual content (see Allais 2016). Indeed, the debate between conceptualist and nonconceptualist readings turns on interpreting passages, e.g., A90/B122–3, where it is unclear whether Kant is discussing a genuine metaphysical possibility or a merely epistemic one (see Allais 2016). As I will show, a similar interpretative challenge will prove to be crucial to the present discussion. Given the complexities involved, however, a careful analysis of the relation between the two problems and respective debates cannot be pursued here.

secured basic experience ever further, how can it play any substantial role in relation to empirical truth?[7] Methodological interpreters generally undercut the significance of this aspect of reason. However, the latter strategy does not seem particularly successful in terms of textual analysis. Kant generally employs the word "touchstone" in relation to truth with a strong meaning, namely that of necessary condition.[8] This reading is clearly supported by the second passage quoted above: if, without the coherent use of the understanding guaranteed by reason, there would be *no sufficient* mark of empirical truth, it seems that reason must play some fundamental role in making empirical truth possible.

Despite such resounding statements, however, Kant does not particularly elaborate on why and how reason is a necessary condition of empirical truth. This has made the interpretation of such passages puzzling also for transcendental interpreters. Most of them do not offer a reconstruction of such a contribution or appeal to a vaguely determined form of 'coherentism.'[9] This, however, does not seem either supported by the text or enough to discard the methodological interpretation. For it is commonly accepted that the question of truth–if a question, at all–is fully settled in the Transcendental Analytic and that reason is not really required for making empirical truth possible.

In this chapter, I will attempt a reconstruction of reason as a 'touchstone of truth' in close connection with Kant's general theory of truth. In particular, I will try to answer the following questions: Is the notion of truth Kant expounds in the Transcendental Analytic complete? Does it need the contribution of the faculty of reason? And if this is the case, how should we conceive of such a contribution? I will argue that Kant's treatment of truth in the Analytic gets completed in the Appendix with an often neglected but

[7] Guyer makes a similar point; see Guyer 2017, 54.
[8] Kant generally gives a strong meaning to this term when related to truth. For example, the principles of general logic are called the "negative touchstone" of truth (see 2.1). In *On a Discovery Whereby Any New Critique of Pure Reason Is to Be Made Superfluous by an Older One* (1790), Kant explicitly refers this term to the "elements of our a priori cognition and the ground of their validity with regard to objects prior to all experience" (*Discovery*, 8:188).
[9] See Walker 1990, Abela 2002, and Allison 2004.

compelling argument (what I shall call the Variety Argument). This argument postulates such a variety in the appearances that are given to us as to undermine any attempt at formulating empirical truths. Crucially, I will argue that this variety does not depict an extreme-case scenario, but our own epistemic situation without reason. Reason completes Kant's theory of truth by allowing the understanding (i.) to form empirical concepts and (ii.) approximate to empirical truth. The strategy of the chapter is as follows. I will first introduce the key elements of Kant's theory of truth (Section 2). I will then present and criticize the methodological and transcendental interpretations of reason's contribution to truth (Section 3). I will use this criticism to propose a refined reading of the main argument of the first part of the Appendix and I will explain how such an argument helps us understand reason's contribution to truth (Section 4). Finally, I will conclude (Section 5).

2. A brief reconstruction of Kant's notion of truth

2.1 Kant's definition of truth

Right at the beginning of the Appendix, Kant specifies that the categories of the understanding "lead to truth, i.e., to the agreement of our concepts with their objects," while reason and its ideas effect only a mere "illusion" (A642/B670). The reason for this difference seems to be the following: while the concepts of the understanding directly have to do with objects, ideas relate to the concepts of the understanding and hence have to do with objects only indirectly. From this, however, it does not follow that reason cannot have an *indirect* contribution to truth. This is exactly how Kant repeatedly and carefully portrays such a contribution. As is evident from the passages above, reason's contribution to truth is always mediated by the understanding. Reason is not directly a touchstone of truth, but a "touchstone of truth *for the rules of the understanding*"; without reason, we would have "*no coherent use of the understanding*, and, lacking that, no sufficient mark of empirical truth"; reason's systematicity guarantees the "*correctness*" of the "*empirical use of the understanding.*" If reason is a necessary condition of truth, then it must be an *indirect* condition of truth.

Unfortunately, Kant does not offer anywhere a systematic account of truth. But when he does speak about it, he always refers to the concept of truth as 'agreement' (or correspondence) he inherits from the tradition.[10] In the third section of the Introduction to the Transcendental Logic, Kant explicitly claims that the definition of truth as "the agreement (*Übereinstimmung*) of cognition with its object" is "granted and presupposed" in his *Critique* (A58/B82).

He specifies that this definition of truth does not provide us with "the general and certain criterion of the truth valid of any cognitions" (A58/B82), or, as he puts it in the *Jäsche Logic*, the "universal material criterion of truth" (*Jäsche*, 9:50–1). Such a criterion, similarly to the Cartesian criterion of clarity and distinctness or the Leibnizian principle of identity, would be a sign or rule that always allows us to decide whether a certain cognition is true or not. But, for Kant, if truth is the agreement of cognition with its object, then no universal material criterion of truth can be possible (see A58–9/B83). It is simply contradictory, Kant argues, to demand a criterion that can account for the agreement of a particular cognition with a particular object and that is, at the same time, valid for all cognitions. There can be a universal criterion, but it must be formal. In the *First Critique* as well as in the lectures on logic, he identifies the latter with the principles of general logic (the principle of contradiction, the principle of sufficient reason and the principle of excluded middle; as they are listed in *Jäsche*, 9:51–3), which can merely certify whether a cognition is formally correct; that is, whether it agrees with itself, not with the content to which is related. As a result, this formal criterion is a necessary, but insufficient condition of truth: the "negative touchstone of all truth" (A60/B84).

One might take this treatment of truth to mean two things: that for Kant there cannot be other criteria of truth than the merely negative ones provided by general logic; and that, as a result, the definition of truth as 'agreement'

[10] Often referred to as the 'correspondence theory of truth.' I do not suggest, however, that Kant's theory of truth can be read along the lines of contemporary interpretations of the same theory as, for example, Hanna 2000 does.

does not play a really significant role in Kant's philosophy.[11] However, following Hanna 2000 and Rosenkoetter 2009, neither of these claims is supported by the text. As regards the former, Kant only claims that there cannot be a unique, universal material criterion; from this, however, it does not follow that there cannot be other criteria of truth in addition to general logic (see Hanna 2000, 244). As regards the second claim, it is sufficient to note that Kant argues for the self-contradiction of a universal material criterion on the very premise that truth *is* "correspondence" (A58/B83).[12] Since this premise is never questioned elsewhere—as we saw, instead, the definition is "granted and presupposed"—and is mentioned again and again in crucial passages throughout the *Critique*, we should take the definition very seriously as our best effort to defining truth (see Rosenkoetter 2009, 196–7).

2.2 The relation between truth and the understanding

It is admittedly difficult to complement the view on truth Kant offers in the Introduction to the Transcendental Logic and in his logic lectures with the positive parts of his transcendental philosophy. It is, however, worth noting that in the course of the Analytic Kant repeatedly connects the faculty of understanding with truth.[13] What has the pure understanding got to do with truth? How does it enter the picture of truth as 'agreement' illustrated above? An answer is offered by the following passage:

> These rules of the understanding are not only true *a priori* but are rather even *the source of all truth*, i.e., of the agreement of our cognition with objects, in virtue of containing the ground of the possibility of experience, *as the sum total of all cognition in which objects may be given to us* (A237/B296; emphases added)

[11] Indeed, this has been a standard approach to the question of truth in Kant. See, for instance, Kemp Smith 1962.
[12] With respect to the self-contradiction of a material universal criterion, Kant says: "it is already a great and necessary proof of cleverness or insight to know what one should reasonably ask" (A58/B82).
[13] Kant calls the aspect of truth that has to do with the transcendental principles of the understanding "transcendental truth" (A146/B185).

A necessary condition of truth (as the agreement of cognition with object) is the possibility for objects to be given to us. Since for Kant objects are given to us in experience as "the sum total of all cognition," this amounts to the possibility for our cognitions to be *objectively valid*. Pure understanding offers such a necessary condition. Truth is made possible by the fact that the understanding, while providing the conditions of possibility of experience, also provides the conditions of possibility of the objects of experience (see also A111 and A158/B197).

The problem of how objectively valid cognitions are possible represents the leading question of Kant's critical *Erkenntnistheorie*, from his letter to Marcus Herz (1772) to the core parts of the Transcendental Analytic in the *First Critique*. As such, the full theory cannot even be summarized here.[14] For present purposes, I would like to highlight only the relation between the concepts of the understanding and empirical truth. The transcendental deduction alongside the doctrine of schematism are supposed to show how the pure concepts of the understanding acquire objective validity when applied to appearances. Categories of understanding are related to appearances through their respective schemata which provide them with "significance" (A146/B185). As a result, Kant says, they are "in the end of none but a possible empirical use", since they merely serve to subject empirical appearances to general rules (ibid.) The understanding thus makes the agreement between cognitions and objects possible at the empirical level; that is, it "makes empirical truth possible" (ibid.).[15]

But how shall we conceive of such an intellectual grounding of empirical truth? Is that a full-blown derivation such as, for instance, the Leibnizian deduction of all truth from the principle of identity? This cannot evidently be the case for otherwise the categories would be universal material criteria of truth. Kant is very careful in delimiting this condition of possibility. The "agreement with the laws of the understanding", Kant says, is

[14] See Rosenkoetter 2009 for an extended discussion of the Analytic as a "logic of truth" (A131/B170).

[15] The passage reads: "all of our cognitions, however, lie in the entirety of all possible experience, and transcendental truth, which precedes all empirical truth and makes it possible, consists in the general relation to this."

the “formal aspect of all truth” (A294/B350). And similarly, the Analogies of Experience, based on the categories of relation, are said to account only for the “formal conditions of empirical truth” (A191/B236). Kant is clear: the content of appearances—the appearances in their *materiality*—can only be given to us in intuition. As a result, the material aspect does not depend on the understanding. Rather, as Kant puts it, “the understanding depends on this as its condition: that are given to us in intuition, to which it can be applied” (A62/B87).

The main points of Kant’s notion of truth can be summarized as follows. For Kant, truth is the agreement of cognition with its object. Such a definition, however, does not give us a universal material sign of truth. From the definition it follows, instead, that the notion of such a sign or criterion is self-contradictory. There can be universal criteria, but they must be formal: the rules of general logic and the principles of the understanding. Their formality, however, must be distinguished. Logical rules merely assure the internal consistency of cognitions. The laws of the understanding are, instead, responsible for making our cognitions objective, and yet they cannot determine the content of our experience. This latter aspect of truth is given to us only in intuition.

2.3 Empirical truth: textual analysis

Is the above reconstruction complete? Do the rules of logic and the rules of the understanding suffice when it comes to grounding empirical truths? To answer these questions and see whether reason might enter this picture, we need to focus a bit more on Kant’s notion of empirical truth. Recall that in the Appendix systematicity is presented as providing a criterion of empirical truth—we should, therefore, evaluate whether systematicity might actually be required by empirical truth, or as claimed by the methodological interpretation represents just a desideratum for extending our knowledge.

The definition of truth implies that, at the empirical level, truth is the agreement of empirical cognitions with objects. First, what is an empirical cognition? Since for Kant cognition always results from the unification of

intuitions provided by the faculty of sensibility and concepts provided by the understanding (see A51/B75–6), a cognition that regards empirical experience is a cognition that involves sensible intuitions and empirical concepts. Second, according to the definition of truth, empirical cognitions must agree with objects. There are, therefore, at least two preconditions required in order to have empirical truth: (i.) the possibility of formulating empirical concepts; and (ii.) the agreement of empirical cognitions with objects. A standard reading of Kant's account of empirical concepts, shared by methodological interpreters, does not invoke reason as a condition of truth and finds the answers to (i.) and (ii.) in our experience and the application of the concepts of the understanding.[16] This reading is textually supported as follows.

(i.) The *locus classicus* for Kant's account of empirical concepts formation is the *Jäsche Logic*. There Kant provides an empiricist account of the origin of empirical concepts. Empirical concepts, for Kant, both contain marks and can be contained in other concepts as marks: for example, the concept 'gold' contains the marks 'yellow' and that of 'not-rusting' and is contained in the concept 'metal.' As regards their origin, Kant claims that it is possible to derive empirical concepts from sensory experience through "comparison of objects of experience":

> An empirical concept arises from the senses through *comparison* (*Vergleichung*) *of objects of experience* and attains through the understanding merely the form of universality. The reality of these concepts rests on actual experience, from which, as to their *content*, they are drawn. (*Jäsche*, 9:92; emphases added)

The content of empirical concepts is drawn from actual experience; their universal form is instead attained through the understanding. But how can this universality be explained? The "logical *actus*" of origination of the form of concepts, Kant explains, consists in the three operations of comparison,

[16] Compare the following view of a methodological interpreter (Pickering 2011, 438): "the Transcendental Analytic and the *Jäsche Logic* provide an account of the formation of empirical concepts which makes no mention of a presupposition of necessary homogeneity."

reflection, and abstraction (*Vergleichung*, *Überlegung*, *Absonderung*; *Jäsche*, 9:94–5). The concept 'tree,' to use Kant's example, results from comparing the differences of objects as regards their parts (trunks, branches, leaves, etc.), reflecting on their commonalities and abstracting from their other properties (see ibid.). Abstraction is only considered as a "negative condition" for generating universal representations; comparison and reflection are the operations actually responsible for this generation (ibid., 9:95). It seems, therefore, that once the content of empirical concept is provided by intuition and perceptions, their universality can be explained in purely logical terms.

(ii.) If, according to the definition of truth, empirical cognitions must agree with objects, they must have some form of objective validity (or reality)—in other words, they must be legitimately applied to objects. As we saw in 2.2, this requirement is provided by the categories of the understanding that make empirical truth possible. But as highlighted by Hanna 1993 and Willaschek and Watkins 2017, this requirement is not a sufficient condition for a cognition to be true. Kant clearly distinguishes the objective validity of a cognition from its being true or false. For example:

> A cognition is false if it does not agree with the object to which it is related *even if it contains something that could well be valid of other objects*. (A58/B83; emphases added)

An objectively valid cognition describes a possible object of experience, which, however, may not agree with the actual object of empirical intuition. If we want to distinguish between true and false empirical cognitions, we need a criterion that tells us that possible objects of experience and actual objects *do* agree with each other. Now, appearances are not by themselves decisive criteria of truth for the origin of such representations might be entirely subjective, as in dreams or hallucinations. For Kant, such criterion seems to be instead the coherent "connection of representations" through the concepts of the understanding:

> If an appearance is given to us, we are still completely free as to how we want to judge things from it. The former, namely the appearance, was based on the

> senses, but the judgment on the understanding, and the only question is whether there is truth in the determination of the object or not. The difference between truth and dream, however, is not decided through the quality of the representations that are referred to objects, for they are the same in both, but through their connection according to the rules that determine the connection (*Zusammenhang*) of representations in the concept of an object, and how far they can or cannot stand together in one experience. (*Prolegomena*, 4:290)

As Hanna puts it, the connection, or better, coherence (*Zusammenhang*) of representations results from the "effective application" of the rules of the understanding to perceptions (see Hanna 1993, 12–13). The effective application of such rules allows us to distinguish a merely subjective ordering of perceptions (such as the one we have in dreaming) from a necessary and rule-governed ordering of them. But for Kant, a necessary and rule-governed order of perceptions is precisely what establishes an object of experience that exists independently of our perceptual access to it (see, e.g., A191/B236). In short, the fact that appearances are coherently organized according to the conceptual rules of the understanding is a necessary criterion to distinguish a merely subjective from a *true* empirical cognition. It thus seems that reason is not required to ensure the possibility of the agreement of empirical cognitions with objects.

In my view, the above reconstruction of empirical truth, although faithful to several passages of Kant's corpus, gets challenged by Kant himself in the Appendix. My interpretative strategy, however, does not consist in charging Kant with contradiction. Rather, I will argue that reason *completes* the conditions provided by the understanding and transcendentally *complements* the empiricist account of concept formation offered by Kant in the texts quoted above. This contribution has been unjustly neglected by methodological interpreters as well as not fully recognized by transcendental ones either. Or at least this is what I shall argue in the remainder of this chapter.

3. Methodological and transcendental interpretations of the systematicity of reason

3.1 Logical systematicity and methodological interpretations

Why do need to complement Kant's account of empirical truth with reason's systematicity? In order to answer this question, we need to understand what our epistemic situation without the systematicity of reason is like and how exactly reason is supposed to contribute to it. These are not easy matters to settle. The Appendix to the Transcendental Dialectic is a convoluted text, and interpretations substantially differ. Although Kant's presentation of systematicity may seem to have little to do with truth, I will show that this not the case and that Kant does present a compelling argument that explains why reason is a necessary condition of empirical truth.

Kant initially presents reason's systematic unity as a "logical principle" (A648/B676). That is, a principle that applies to concepts of the understanding. Since, as we saw, reason has no direct relation with objects, it cannot create concepts of objects. Rather, it "unites the manifold of concepts through ideas by positing a certain collective unity as the goal of the understanding's actions" (A644/B672). This process of logical unification is called by Kant the "hypothetical use of reason" (A647/B675). Reason is used hypothetically when the universality of a concept is not given, but only assumed "problematically" —as a "mere idea" (ibid.).

Kant uses clear examples to illustrate the hypothetical use of systematic unity: the ideas of pure elements in the chemistry of his time ("pure air," "pure water," and "pure earth"; A646/B674) and, more extensively, the idea of "fundamental power" (*Grundkraft*) (A649/B677). The latter (FP), for instance, is an idea which is supposed to unify all particular cognitions (or representations) of powers (P). When applied to the human mind, this idea unifies "sensation, consciousness, imagination, memory, wit, the power to distinguish, pleasure, desire, etc." (P_1, P_2, P_3, etc.). We do not logically know "whether there is such a thing" (ibid.)—and yet we introduce such an idea in order to "test" each particular case:

> Several particular cases, which are all certain, are *tested* (*versucht*) by the rule, to see if they flow from it, and in the case in which it seems that all the particular cases cited follow from it, then *the universality of the rule is inferred*, including all subsequent cases, even those that are not given in themselves. (A646–7/B674–5; emphases added)

To use Kant's example, in accordance with FP we try to see "if imagination combined with consciousness may not be memory, wit, the power to distinguish, or perhaps even understanding and reason" (A649/B677). If we manage to reduce several particular cases to common rules, we infer their universality: in this case, we infer the hypothetical concepts of "comparatively fundamental" powers (FP_1, FP_2, etc.; ibid.). We can then compare these concepts once again in order to approximate the unity and universality of an "absolutely fundamental" power (FP; ibid.)—the latter, however, remains an idea beyond our reach.

Although Kant explicitly says that the systematic unity to which the hypothetical use of reason is directed is a "touchstone of truth" for the rules of the understanding (A647/B675), most interpreters have not been impressed by this and other similar claims. Methodological readers, in particular, maintain that systematic unity is a subjective method for extending our already obtained empirical cognitions rather than a necessary condition of empirical truth. In fact, they take the standard account of empirical truth I presented in 2.3 to mean that the act of comparison is sufficient to generate the basic level of empirical concepts (in the example, P_1, P_2, P_3, etc.). Reason is instead required to ground second-order concepts that have no direct evidence to support them (e.g., fundamental powers, FP_1, FP_2). As such, it is at best a necessary condition for extending our empirical cognition, rather than making it possible.

I submit that, at this stage of Kant's formulation, one may be tempted to agree with the methodological reading. For logical systematicity is a principle that can only be valid as a *subjective* principle that applies to our cognitions. Indeed, Kant says that it is a "subjectively and logically necessary as method" (A648/B676). But if systematicity is only a subjective method, it is

unclear how it can contribute at all to empirical truth as the agreement of empirical cognition with *objects*.

This is not, however, the end of the story. Kant is explicit that the employment of a logical principle of unification that allows us to postulate ideas, in turn, requires a corresponding principle that does not merely reflect a subjective "economy" or "an interest of reason," but somehow applies to the "constitution of objects" (ibid.). Such a principle, Kant says:

> would be a transcendental principle of reason, which would make systematic unity not merely something subjectively and logically necessary, as method, but objectively necessary. (A658/B676)

The transcendental principle of systematic unity, which Kant most often exemplifies with the principle of "genera" or "sameness of kind" (A654/B682), is presented as a precondition for the logical principle of unity:

> In fact it cannot even be seen how there could be a logical principle of rational unity among rules unless a transcendental principle is presupposed, through which such a systematic unity, as pertaining to the object itself, is assumed a priori as necessary. (A650/B678)

Moreover, Kant expands his account to include other rational operations for the use of the understanding according to a triadic structure similar to that of the categories. To the transcendental principle of genera is opposed the "transcendental principle of species," which demands "manifoldness and variety in things despite their agreement under the same genus" (A657/B685). And finally, a third principle—as the combination of the first two—is included in order to complete the systematic unity of reason: the "transcendental principle of affinity," which presumes continuity of natural forms, that is "continuous transition" among species (ibid.).[17]

[17] In this chapter, I particularly focus on the first, and probably most exemplary, application of systematic unity ('sameness of kind'). This is not to say, however, that the other two principles would not deserve a more detailed examination than the one presented here. On 'specification' and 'affinity' as logical principles of reason, see Chapter 3.

It is important to point out that the mere transition from logical to transcendental principles is insufficient to settle the controversy between methodological and transcendental interpretations. Transcendental principles can still be interpreted in a way that does not make them necessary condition of empirical cognition. Most methodological interpreters have indeed tried to square their accounts with the transcendental principles of reason: either interpreting them in a deflationary way,[18] or as mere presuppositions resulting from an illusion.[19] Nor is the transition per se particularly telling regarding our specific question about empirical truth. I will argue, however, that Kant, in order to support the transition from logical to transcendental principles of reason, offers a specific argument—the Variety Argument—which is supposed to complement his doctrine of empirical truth. In the next subsection I will introduce the argument and critically engage with previous interpretations of it.

3.2 Transcendental interpretations of reason's systematicity and objections

The Variety Argument takes the form of a *reductio ad absurdum* and is heavily relied upon by transcendental interpreters. The argument reads as follows in its most detailed formulation:

> If among the appearances offering themselves to us there were such a great variety (*Verschiedenheit*)—I will not say of form (for they might be similar to one another in that) but of content, i.e., regarding the manifoldness of existing essences (*der Mannigfaltigkeit existirender Wesen*)[20]—that even the most acute human understanding, through comparison (*Vergleichung*) of one with another, could not detect the least similarity (a case which can at least be thought), then the logical law of genera would not obtain at all, no concept of a genus, nor any other universal concept, indeed no understanding at all would obtain, since it is the understanding that has to do with such concepts. The logical principle of genera

[18] That is, not as conditions of experience as empirical cognition. On Guyer's account the idea of systematic unity is only "transcendental in some sense" (Guyer 1990, 28). Similarly, Willaschek argues that "transcendental" here only means "concerning objects" (see Willaschek 2018, 117).
[19] E.g., Grier 1997 and Pickering 2011.
[20] I have modified Guyer's translation which reads "manifoldness of existing beings."

> therefore presupposes (*setzt…voraus*) a transcendental one if it is to be applied to nature (by which I here understand only objects that are given to us). According to that principle, sameness of kind is necessarily presupposed in the manifold of a possible experience (even though we cannot determine its degree a priori), because without it no empirical concepts and hence no experience would be possible. (A653/B681)

Despite its apparent simplicity, the argument has proven to be particularly difficult to unravel. Geiger 2003 offers the most detailed reconstruction of reason's transcendental contribution to truth and finds in this passage textual support against the methodological reading. For here Kant clearly envisages a situation in which no empirical cognition would be possible without reason's transcendental principles. What is then the problem with the methodological reading?

Geiger argues that the methodological interpretation erroneously assumes that for basic concepts of experience the condition of applicability is given by intuition alone. The lowest level of experience, according to methodological readers, seems not to require any additional transcendental assumption but it is just, as it were, "read off intuition" (Geiger 2003, 288). To use the example of the concept 'gold' we have seen in 2.3, the marks that allow us to apply this concept ('yellow,' 'not-rusting,' etc.) are simply given to us in intuition through comparison of similarities.

For Geiger, this assumption fails to recognize an important implication of Kant's claim that intuitions without concepts are "blind" (B75): as he puts it, that "*intuitions without empirical concepts are still blind*" (Geiger 2003, 290). On this reading, the Variety Argument shows that even 'basic' relations of similarity must be conceived of as conceptual relations holding between appearances. For instance, to say that that two appearances are similar (say, yellow) is to say that they can be subsumed under a single concept (the concept 'yellow'). At the same time, this concept must be further specified according to its own marks (which are also empirical concepts).

We therefore need ever more general and specific empirical concepts to determine the basic level (and any level) of experience. The

transcendental assumption of an infinitely specified system of concepts is therefore, for Geiger, a necessary condition for concepts to correspond to objects (see ibid., 291). This reference is never immediately extracted from intuition, but always made possible by a systematic relation of concepts.[21]

This reading, as I see it, has the merit of attempting to explain why systematicity should be thought of as a necessary condition of all empirical cognition. Its interpretative cost, however, is high. Kant's corpus is notoriously ambiguous on whether empirical concepts are required in order for particular objects to be given to us.[22] Indeed, methodological readers have rejected this reading by appealing to passages in which Kant seems to admit that particular objects can be given to us in intuition.[23] Moreover, this interpretation does not seem to fully capture what Kant is after when introducing reason's transcendental principles and presenting the Variety Argument. Geiger suggests reading transcendental systematicity as the presupposition of an infinitely specified system of concepts. But as we saw, transcendental principles are not logical principles that apply to concepts. They rather presuppose systematic unity as "objectively necessary," or "pertaining to the object itself" (A658/B676; A650/B678; see also A668/B696). Indeed, in the Variety Argument Kant seems concerned with the problem of how logical principles (presupposing systematic unity of concepts) can be "applied" to the objects of nature (A653/B681).

Allison's account of the Appendix seems to better capture this aspect of the principles of reason. According to his reconstruction, the transcendental principles of reason amount to the presuppositions of an underlying order of nature (or of "natural kinds"; Allison 2004, 434) which acts as an "application condition" for the concepts of the understanding and

[21] See Geiger 2003, 290–1: "The reference of a concept is given through its systematic, conceptual relations with other concepts. The world of objects is given to us through a system of concepts."
[22] Geiger seems therefore committed to a form of 'conceptualism' when arguing that the "empirical world" can be given to us only through empirical concepts (see Geiger 2003, 290–1).
[23] See, e.g., Pickering 2011.

assures the rationality of our application of logical principles to nature (ibid., 435). In his words:

> Without unity, that is, without the possibility of grouping diverse phenomena into genera and these into higher genera, and so forth, the understanding could gain no foothold in the world. Similarly, without the capacity to draw distinctions within these genera, that is, to divide them into species, and these into subspecies, and so forth, the understanding would be unable to take a single further step. (Allison 2004, 434)

While Allison's proposal seems closer to the gist of the Variety Argument, the reason why the understanding "could gain no foothold in the world" without reason is far from clear. Why would the understanding be insufficient to group different phenomena? What is missing in our epistemic situation without reason? And what does reason do precisely to enable empirical cognition? These questions remain largely unanswered in Allison's reading, thus making the view that systematicity is a necessary condition of empirical cognition easily objectionable.

One prominent challenge has been recently made by Pickering. For Kant, as we saw, seems to hold an empiricist account of concepts. Since we actually discover regularities in our experience of nature, why do we have to transcendentally assume something that experience can teach? From a methodological perspective, Pickering argues that the fact of experience absolves us of the need to make such an assumption. Systematicity cannot be a transcendental principle, for the simple reason that empirical cognition and experience are possible without it.

> The passage [the one presenting the Variety Argument: A653/B681] concerns the possibility that the manifold of possible experience is completely heterogeneous. Of course, if this were true, then neither empirical concepts nor experience would be possible. But all Kant has supposed in this counterfactual statement is there being no similarity at all among appearances. (Pickering 2011, 439)

Pickering notices that the argument only holds in the scenario postulated at the beginning of the passage: a world populated by irreducible differences. This is, however, our case—we normally cluster properties and things, at least minimally, without the aid of reason because our world is indeed full of amenable similarities. Reason is instead only responsible for systematizing such an ordering: in the methodological terminology, systematicity gives us a "maximum" of order, not the "minimum" we need for basic experience (ibid.).

This objection may indeed deal a mortal blow to any transcendental interpretation. I think, however, that a convincing answer to this challenge can be given by revising the interpretation of Kant's argument.

4. Reason's contribution to truth

4.1 The Variety Argument revisited

One may assume that the scenario Kant introduces with the Variety Argument applies only to a world with no similarities. Pickering convincingly argues that the fact of experience already dispenses us from any proper transcendental assumption.[24] But if this is correct, what use would a counterfactual postulating a world populated by irreducible differences have? I contend that the function of the Variety Argument is not simply that of postulating an extreme-case scenario which happens not to be our own. Rather, it describes a 'genuine' possibility, namely a possibility that applies to our world and that would undermine our epistemic situation if we were not equipped with reason's principles of systematicity. In other words, it tells us what is missing without reason's contribution and what reason is required to do to correct the initial state.

In order to understand what jeopardizes our epistemic situation without reason, we first need to clarify what is exactly postulated in this scenario. Kant specifies that the "great variety" of appearances does not concern the forms we encounter in experience—in fact, appearances "might be similar to one another in that"—but the very "content" of appearances—

[24] Pickering maintains reason's principles as illusory principles that are "only assumed to be or presupposed as transcendental" (Pickering 2011, 446).

the “manifoldness of existing essences (*Wesen*).” In this scenario, Kant continues, even “the most acute human understanding” could not detect “the least similarity.” Accordingly, the similarities that any understanding could not identify among appearances are similarities in terms of “content” or “essence.” Kant also calls the essence of something its “nature” (e.g., *Vienna*, 24:840) and defines it as the “first basic concept of everything that really and in fact belongs to the thing” (*Blomberg*, 24:116; see also *Jäsche*, 9:144).[25]

But what does it mean for appearances to be formally similar, yet various in terms of ‘essential’ content? To answer this question, we need to go back to our discussion of empirical truth and take a closer look at the example Kant most extensively discusses in the first part of the Appendix: the idea of fundamental power (FP). In our previous discussion, we saw that the understanding contributes to the *formal* aspect of empirical truth. It does so by allowing objects to be represented through its concepts—for instance, through the pure concept of substance. These concepts, however, do not determine the particular content of the given object—the content of appearances is given to us in experience only. This means that two appearances may be formally similar as ‘substances,’ and yet radically differ with respect to their content.

This distinction finds textual confirmation in the way Kant describes the particular concepts of powers that the idea of fundamental power (FP), as we saw, is supposed to unify. These powers (P_1, P_2, P_3, etc.) issue from the application of the concept of “causality of a substance” or “power” (*Kraft*) to the manifold of appearances. Note that ‘power’ (P) is a concept of the understanding and results from the combination of two categories: substance

[25] It is plausible to assume that Kant is here referring to what he otherwise calls “real essence.” See, for example, *Jäsche*, 9:61: “for the real essence of the thing (*esse rei*) we require cognition of those predicates on which, as grounds of cognition, everything that belongs to the *existence of the thing* depends” (emphasis added). Kant clearly states that the presupposition of systematicity concerns the “essence (*Wesen*) of things” in A693/B721: “the regulative principle demands that systematic unity be presupposed absolutely as a unity of nature that is recognized not only empirically but also *a priori*, though still indeterminately, and hence as following from the essence (*Wesen*) of things.” For an extended discussion of the relation between real essences and reason, see Chapter 5.

and causality. P_1, P_2, P_3, etc. are therefore all 'powers' in the formal sense, and yet we still do not know whether they are "various expressions of one and the same power" (A649/B677). This is a separate, *empirical* question that requires a different kind of unity: the idea of 'fundamental power' (FP).[26]

If this is correct, we have gained an important insight. While the logical dimension may lead us to think that systematicity only applies to already given empirical concepts, this is not the case at the 'basic' level of experience. P_1, P_2, P_3, etc. are direct applications of pure concepts of the understanding to appearances, but they are still *not* empirical concepts. Systematicity is required in order to form concepts of their unity (in this case, empirical concepts of "comparatively fundamental" powers that we progressively compare and unify; FP_1, FP_2, etc.). In fact, Kant says that when the logical law of genera does not obtain, "*no concept of a genus, nor any other universal concept, indeed no understanding at all would obtain*" either.[27]

Now, the Variety argument postulates that formally similar appearances indeed differ from each other. Is this a mere counterfactual statement disconfirmed by experience? Or rather a genuine possibility that jeopardizes our epistemic situation without reason? I contend that Kant argues for the latter option. For (1) as we just saw, pure understanding cannot determine *how various* appearances are. As far as the categories are concerned, it is entirely possible that nature presents us with a variety of appearances that defies our intellectual grasp. As a result, we would be given with a manifold of irreducible particular representations and it would not make sense for us to attempt a unification of them. If this cannot be done by the understanding a priori, it may be done empirically—the fact that the understanding finds similarities should suffice to eliminate the possibility of this scenario. But this cannot be right either. For (2) the similarities that the understanding may detect through comparison are merely *contingent* and

[26] On my reading, empirical concepts are therefore necessary to acquire *empirical cognition* of particular objects. Contra conceptualist readings, however, I maintain that particular objects can be given to us in intuition *without* empirical concepts.
[27] This is not to deny that systematicity can also be applied to concepts we have already formed. Its function would then be that of forming *new* empirical concepts.

cannot tell us whether various appearances are "really and in fact" similar, or similar "with respect to the manifold of existing essences."[28] As Kant repeatedly asserts, we cannot derive systematic unities by simply looking at the "contingent constitution of nature" (e.g., A651/B679; A645/B673).

A priori and empirical considerations seem insufficient to rule out the possibility that appearances are really different from each other. This, however, would jeopardize the possibility for any cognizing subject to acquire empirical cognition. In the case of fundamental power, reason would be "free to admit that it is just as possible that all powers are different in kind" and we would have no "warrant" to "treat the manifoldness of the powers which nature gives to our cognition as merely a concealed unity" (A651/B679). In other words, we could not investigate nature according to principles of unity and we would be left with a manifold of irreducible particular cognitions.[29]

If without reason our epistemic situation would be defective, what does reason do in order to correct this state? In a nutshell, Kant's solution is the following. Reason is invoked in order to "presuppose" (*voraussetzen*) systematic unity among appearances, or "in the manifold of possible experience." This is the transcendental step that gives any cognizing subject "warrant" to postulate logical unities and systematize appearances. For instance, reason can start unifying the manifold of powers according to a logical principle of unity only by presupposing that *various* appearances belong to the *same* fundamental power—to use Kant's term, we can investigate nature only by presupposing "sameness of kind" in nature. Importantly, sameness of kind as well as the other principles of systematicity must be presupposed *necessarily*. Recall that the presupposition of this unity cannot be derived from the contingent similarities we encounter in

[28] In his lectures on logic, Kant explains that we cannot know the essences of things because we cannot have complete experience of them: "to have insight into the real essence exceeds human understanding. We cannot provide a complete ground for a single thing. This requires a universal, complete experience, and to obtain all possible experience concerning an object is impossible" (*Vienna*, 24:839–40). See Chapter 5 for a discussion of this problem.

[29] If this reconstruction is correct, Kant's view in the *First Critique* seems to have several similarities with the transcendental deduction of the principle of purposiveness in the *Critique of the Power of Judgment* (see *CPJ*, 5:181–6). Comparing the two texts goes, however, well beyond the remit of this chapter.

experience. The presupposition of unity is, instead, a transcendental and necessary “law of reason” without which “no empirical concepts and hence no experience would be possible” (A654/B682).

Before spelling out the details of reason’s contribution to empirical concept formation and truth, let me clarify one important point. The necessary presupposition of systematic unity may seem to lead Kant into metaphysical territories. But at a closer look, this is not the case. For one thing, the presupposition of systematic unity does not concern things in themselves, but appearances—as Kant says, by nature he means “only objects that are given to us” (ibid.). And second, systematic unity is only presupposed in order to ground the rationality of our logical classifications. As we saw, the understanding cannot determine the content of appearances nor rule out the possibility of the Variety Argument. Even less can reason do such things since it is only indirectly related to objects. In fact, Kant says that reason only presupposes systematic unity “indeterminately” (A693/B721). This means that the presupposition of systematic unity does not determine nature *as* systematic nor preestablishes *what* we are going to find in it (for instance, fundamental power). It is, instead, a necessary law that regulates our empirical investigation of nature and without which the latter could not take off the ground.

4.2 Completing the conditions of truth

That reason is a “touchstone of truth” was a rather puzzling claim after the introduction of logical systematicity. Indeed, its being a subjective principle which applies to concepts may incline us to think that systematic unity is only a methodological principle to extend our knowledge. The above reading of the Variety Argument, however, leads to a very different picture. First, the particular cognitions reason unifies are not (necessarily) already acquired empirical concepts. Rather, where categories are applied to appearances, reason’s systematicity is required in order to generate empirical concepts. Second, we saw that the logical dimension of systematicity is only possible on the basis of an objective, transcendental presupposition of systematicity.

Indeed, logical systematicity alone is insufficient to explain why reason is a condition of truth as the agreement of cognitions with objects. After considering systematicity as both a logical and transcendental principle, I should be able to finally explain how reason contributes to empirical truth.

As we saw, reason cannot determine the objects of experience. It can, however, legitimately apply to the understanding and *indirectly* contribute to truth. Reason can therefore be a "touchstone of truth" for the understanding and assures its "coherent use" and "correctness" only by regulating the way the understanding relates to empirical objects (that is, the agreement of cognitions with objects that represents the relation of truth; see 2.1). But how exactly does reason indirectly complete the conditions of empirical truth provided by the understanding? To answer this question more precisely, we need to go back to Kant's account of empirical concept formation (i.) and of the agreement of empirical cognitions with objects (ii.).

(i.) It is indeed remarkable how well several passages of the Appendix transcendentally dovetail with the empiricism of the *Jäsche Logic*. As we saw, "comparison" (*Vergleichung*) is the general term Kant uses to indicate the operation through which empirical concepts arise and, specifically, the first of the three "logical *actus*" of concepts formation. Now, the Variety Argument postulates a scenario in which the very *comparison* (*Vergleichung*) of appearances cannot lead to any recognized similarity. If this scenario, as argued, genuinely applies to our epistemic situation without reason, the possibility of comparing objects of experience would be undermined not only in the extreme cases of absolute absence of similarities, but also and more fundamentally in the basic experience of our world. In other words, this means that the empiricist account Kant offers in the *Jäsche Logic* is now deemed incomplete.

I argue that Kant in the Appendix technically complements his empiricist account of concept formation. No matter how many various appearances we compare, without the transcendental presuppositions of reason, we would have, Kant says, no "universal concept" and "no understanding at all would obtain, since it is the understanding that has to do

with such concepts" (A653/B681). By presupposing systematicity among appearances, reason assures that the understanding is coherently used with respect to empirical objects. In particular, reason postulates ideal unities *according to which*, as we saw in our discussion of the hypothetical use of reason, the understanding *can* compare various appearances and generate empirical hypotheses at any level of experience. If indeed the understanding manages to find contingent similarities through comparison of appearances (for instance, different powers of our mind are compared and found to be identical) we can provisionally infer the "universality of the rule" or the relevant empirical concept (in the case discussed, the empirical concepts of "comparatively fundamental" powers; FP_1, FP_2, etc.). The systematic unity of reason is therefore a necessary condition for the formation of empirical concepts.

(ii.) Empirical truth also requires that empirical cognitions (what I take to be cognitions containing empirical concepts) agree with objects. As we saw, such agreement requires not only that an empirical cognition is objectively valid, but also that it is coherently connected according to the categories of the understanding—in other words, that we have effectively applied the categories of the understanding to the order of perceptions. But such criterion is more problematic than it seems. As noted by Hanna, it is not clear how the coherent connection of perceptions can sufficiently distinguish false from true cognitions. Although merely subjective representations, such as dreams and hallucinations, do not generally follow the rules of the understanding, there is no logical inconsistency in thinking the possibility of a well-ordered, yet purely subjective order of perceptions (Hanna 1993, 15). As a result, for Hanna, coherence is an ultimately insufficient criterion of truth and such insufficiency has dire consequences for Kant's theory of truth as a whole (ibid., 15–17). I argue, however, that Kant does have internal resources to address this problem.

As we saw, the Variety Argument postulates precisely a scenario in which the rule-governedness of appearances (according to the pure concepts of the understanding) is insufficient to ground empirical truths. The

effective application of the rules of the understanding to perceptions of powers, for example, does not ensure that such powers are not entirely different from each other and that empirical cognition of them is possible. In other words, the Variety Argument describes a situation in which empirical cognitions, *even if coherently connected according to the rules of the understanding*, still do not necessarily correspond to the objects of nature.[30] We simply do not know whether the conceptual relations we establish among appearances really map onto relations between existing essences. As a result, the Variety Argument shows that there is a further gap between the intellectual coherence of empirical cognitions and their truth.[31]

I contend that the solution to the Variety Argument—that we must presuppose systematicity in possible experience, or that systematicity itself is objectively valid—is meant to progressively bridge this gap. Kant is not leaning towards a 'coherentist' interpretation of truth nor towards a metaphysical reading of the principles of reason. Rather, he is arguing that reason, by presupposing systematicity in nature, sets an indispensable *standard* for the use of the understanding in relation to empirical objects. The understanding ought not be satisfied with well-ordered particular cognitions based on contingent similarities but should aim to progressively unify them, refine them, and test them against experience—in a word, *approximate* them to true cognitions, or cognitions that agree with objects. This is why Kant says that without reason we would have "no sufficient mark of empirical truth"—as he specifies, "in regard to the latter [empirical truth] we simply have to presuppose the systematic unity of nature as objectively valid and necessary" (A651/B679).

But what does it mean that systematicity is presupposed as objectively valid in regard to empirical truth? Kant fully explains this peculiar notion of objective validity at the end of the first part of the Appendix. That systematic

[30] Despite contingent similarities in experience, we could "admit that it is just as possible that all powers are different in kind" (A651/B679); see 4.1.
[31] Kant generally takes objective validity as a necessary, yet insufficient condition of truth (see e.g. A760/B788). A concept is objectively valid when it can be legitimately applied to an object; it is true when it also agrees with that object. For an excellent discussion, see Willaschek 2017, 106–7.

unity is objectively valid means that it can be applied to objects of nature *indirectly* and *through* the use of the understanding:

> Since every principle that establishes for the understanding a thoroughgoing unity of its use a priori is also valid, albeit only indirectly, for the object of experience, the principles of pure reason will also have objective reality in regard to this object, yet not so as to *determine* something in it, but only to indicate the procedure in accordance with which the empirical and determinate use of the understanding in experience can be brought into thoroughgoing agreement with itself, by bringing it *as far as possible* into connection with the principle of thoroughgoing unity (A665–6/B693–4)

Principles of reason, by applying to the understanding a priori, are also valid for the objects of experience to which the understanding directly relates—not as determinations of those objects, but as principles that necessarily regulate the understanding in its investigation of nature. In other words, reason does not preestablish the truth of cognitions but sets up the "procedure" according to which we progressively systematize particular cognitions and approximate them to empirical truth.[32] This procedure is, of course, fallible and never fully completable, but necessary to find out whether our cognitions agree with objects. Presupposing sameness of kind, for instance, does not tell us whether there is such a thing as fundamental power, but legitimately prescribes to the understanding to progressively unify various cognitions of powers, refine them, and test them against experience. As Kant says, principles of systematicity ultimately originate from "the interest of reason in regard to a certain possible perfection of the *cognition of the object*" (A666/B694; emphases added). On my reconstruction, the "perfection of the cognition of the object" is nothing but the empirical truth that reason allows the understanding to approximate.

[32] Accordingly, Kant also says that reason's principles are necessary for attaining the "complete concept of the object" (A510/B38) and approximating to "the highest possible degree of empirical unity" (A677/B705).

5. Conclusion

If the above reconstruction has successfully shown that reason's systematicity is compatible with Kant's notion of truth and indeed completes it, then we have no reason for dismissing Kant's explicit claims in the Appendix regarding reason as a necessary condition of empirical truth and, *a fortiori*, of empirical cognition, as suggested by methodological interpreters. Such a dismissal would not only be unfaithful to Kant's text but would also leave us with an incomplete reconstruction of Kant's notion of empirical truth.

To sum up, I suggested the following points regarding the relation between systematic unity and empirical truth. Reason's systematicity is a condition of empirical truth because it guarantees the coherent use of the understanding with respect to empirical objects. It does so by complementing the understanding with respect to two crucial aspects: (i.) it postulates ideas according to which the understanding can compare appearances and infer empirical concepts; and (ii.) it regulates the understanding in its investigation of nature so that we can approximate empirical cognitions to truth.

That the objectivity of our empirical investigation of nature is grounded upon a rational presupposition may draw criticism from many quarters. If objectivity is, as it were, commanded by reason (as Kant says, "here reason does not beg but commands"; A653/B6891), the foundations of empirical knowledge may seem particularly shaky. Indeed, one might argue that this interpretation can re-open the door to skepticism. I argue, instead, that this implication represents a virtue of the proposed reading for it opens the possibility of an ongoing revisability of universal concepts: a thesis that should be welcomed from the point of view of empirical realism. Fundamental powers are possible as concepts only on the presupposition that sameness of kind is objectively valid. Importantly, however, this presupposition does not determine nature and further empirical research might subsequently lead us to dismiss the inferred concepts. For, as often happens in science, what we unified under a concept may turn out to be an actual variety of objects (in this case, 'powers') that does not conceal any hidden identity of kind. We would then try to conceptualize the same manifold (or part of it) under different concepts, but still in accordance with reason's principles.

One might further object that if empirical cognitions have no definite truth value, then reason's contribution to truth is eventually futile. In order to answer this objection, it is important to highlight the fact that systematicity is not only a presupposition but a transcendental one. It is true that by transcendentally presupposing the principles of reason we are not assigning any definitive truth value to determinate hypotheses. Reason's principles, however, by presupposing systematic unity in nature, ground the very possibility for us to approximate hypotheses to empirical truths—even truths that will turn out to be inappropriate or false according to further empirical research. Recall that the degree of systematic unity is left completely undetermined at the transcendental level of reason. Empirical research progressively determines the undetermined objectivity presupposed by reason without, however, ever replacing it. Indeed, it is the non-empirical character of such principles to foster empirical research, by never predetermining its results and always demanding systematic unity in our cognition of appearances.[33]

With this reconstruction, I hope to have clarified an aspect of reason that remains obscure even in transcendental interpretations of theoretical reason—an obscurity that actually supports the currently predominant methodological interpretations. I have tried to show that reason's characterization as a 'touchstone of truth' can be squared with the theory of truth Kant grants and presupposes in his *Critique*. Reason provides us with two essential preconditions for the tenability of this theory at the empirical level (the possibility of formulating empirical concepts and approximating empirical cognitions to truth) and remarkably dovetails with the other criteria of truth and the empiricist account of concept formation that can be found in Kant's corpus. Although barely acknowledged, reason's contribution needs therefore to be included in any complete reconstruction of Kant's theory of truth.

[33] On the usefulness of the non-empirical character of the ideas of reason, see also Zuckert 2017.

5 Empirical Laws of Nature and the Role of Reason

1. Introduction: the understanding and the empirical laws of nature

Kant's 'Copernican revolution' is presented in the Preface to the second edition of the *Critique of Pure Reason* as a "revolution in the way of thinking" (Bxii) on the basis of the examples of geometry and natural sciences. It consists in the "hypothesis" that we could get further in the problems of metaphysics if we reversed the traditional perspective on cognition.[1] Contrary to the belief that our cognition must conform to the objects, Kant argues for the need to assume that the objects themselves must conform to our cognition (see Bxvi). In this way, the possibility of universal and necessary knowledge can be traced back to our forms of representations, namely the forms of intuition of space and time and the concepts of the understanding.

According to this line of thought, it would be tempting to invest our forms of representations, and in particular those of the understanding, with an almost exhaustive foundational role, and reduce all truth regarding the objects of nature to their conformity to its concepts. Indeed, Kant seems to suggest this line of thought multiple times: e.g., when he defines the understanding as the "faculty of rules," which is "in itself the legislation of nature" and whose principles "must provide appearances with their lawfulness" (A126).[2] Although, as we will see, some interpreters of Kant try to support these bold claims, the problem of how empirical nature is related to the transcendental forms of the understanding is more puzzling than this view might suggest. In particular, commentators have long debated the status of empirical laws nature, namely the laws that govern nature in its

[1] Then "apodictically proved" in the course of the *Critique* "from the constitution of our representations of space and time and from the elementary concepts of the understanding" (Bxxii).
[2] See also *Prolegomena*, 4:320–2; and *MFNS*, 4:518–21.

given particularity and that we can only derive from our particular experience.[3]

In fact, Kant's characterization of the relation between the faculty of understanding and empirical laws of nature is twofold. On the one hand, empirical laws are said to be "only particular determinations of the pure laws of the understanding" and the understanding is said to be the very "source" of the manifold of them (A128). This origin is given a clear modal significance: it is under and in accordance with the laws of the understanding that empirical laws are made "first possible" (A128–A216/B263). The laws of the understanding make nature, as it were, "possible at all,"[4] "without relation," however, as Kant puts it in the *Metaphysical Foundations of Natural Science*, "to any determinate object of experience, and thus undetermined with respect to the nature of this or that thing in the sensible world" (*MFNS*, 4:469). Now, on Kant's account, what kind of possibility is the understanding the source of? Inasmuch as it provides the forms, or conceptual structures, according to which objects are to be represented, the understanding is the source of formal possibility.[5] Particular laws "receive their formal possibility" from the understanding, or they are possible only through the latter as far "as their form is concerned" (A127).[6] And since Kant maintains the traditional definition of truth as the agreement of cognition with the object, he also claims that with these principles we can inquire "only the formal conditions of empirical truth" (A191/B236), that is what makes an agreement with objects possible as such.

[3] Empirical laws of nature are to be distinguished from a priori transcendental laws of the understanding (as they are presented in the Transcendental Analytic) and from a priori metaphysical laws of nature (described in the *MFNS*). Empirical laws of nature are instead a posteriori laws, or laws derived from experience. They include laws of matter as such (e.g., Newton's law of universal gravitation) and laws of different kinds of matter (e.g., laws of chemistry). For a detailed discussion of such distinctions, see Stang 2016, chapter 8.
[4] What the understanding does "is not to make the representation of the objects distinct, but rather to make the representation of an object possible at all" (A199/B244).
[5] For an instructive analysis of formal possibility, see Stang 2016, 200–14.
[6] See the first "postulate of empirical thinking in general": "whatever agrees with the formal conditions of experience (in accordance with intuition and concepts) is possible" (A218/B265). Empirical laws are formally possible inasmuch as they agree with the laws of the understanding.

On the other hand, empirical laws, inasmuch as they deal with particular determinations of nature, cannot be completely derived from the understanding. If empirical laws are indeed empirical (and thereby involve empirically determined appearances that cannot be reduced to our forms of cognition), "experience," Kant says, "must come into play" (B165) in order for us to become acquainted with them. In modal terms, it follows that the laws of the understanding constitute a necessary, though insufficient condition of possibility for particular laws. The possibility assured by the understanding can account for the conceptual form according to which empirical determinations are cognized, but not for the distinct content experience offers us. This point can be clarified through the following passage from the *Metaphysical Foundations*:

> Now to cognize something a priori means to cognize it from its mere possibility. But the possibility of determinate natural things cannot be cognized from their mere concepts […] Hence, in order to cognize the possibility of determinate natural things, and thus to cognize them a priori, it is still required that the intuition corresponding to the concept be given a priori, that is, that the concept be constructed. (*MFNS*, 4:470)

A priori concepts must be complemented by a priori intuitions in order to know the possibility of particular natural things. Now, in the case of metaphysical laws of nature, which merely concern the concepts of "material thing" and "thinking thing" as such, a priori intuitions can be provided in the form of mathematical constructions of concepts (*MFNS*, 4:470–1).[7] But when it comes to empirical a posteriori laws of nature, which involve determinate natural things, there seems to be no mathematical way of filling in our formal structures. That is the reason why, according to many interpreters, Kant holds that disciplines like chemistry are doomed to remain improper sciences.[8] And yet Kant does not dismiss the possibility of empirical a

[7] Discussing the details of metaphysical laws of nature goes beyond the scope of this chapter.
[8] At least in the *Metaphysical Foundations*, Kant seems to hold this view: "chemistry can be nothing more than a systematic art or experimental doctrine, but never a proper science"

posteriori knowledge and, more specifically, deals with the problem of their necessity in many passages of his corpus. Indeed, the Kantian concept of law, and therefore also of empirical law, already includes its being necessary. Consider, for instance, the following *Reflexion*:

> Empirically one can certainly discover rules, but not laws—as Kepler in comparison with Newton—for to the latter belongs necessity, and hence that they are cognized a priori. Yet one always supposes that rules of nature are necessary—for on that account it is nature—and that they can be comprehended a priori; therefore one calls them laws by way of anticipation (*anticipando*). The understanding is the ground (*Grund*) of empirical laws, and thus of an empirical necessity, where the ground of lawlikeness (*Gesetzmäßigkeit*) can in fact be comprehended *a priori*: e.g., the law of causality, but not the ground of the determinate law. All metaphysical principles of nature are only grounds of lawlikeness. (*Refl*. 5414, 18:176)

In this passage, Kant distinguishes the ground of lawlikeness (*Gesetzmäßigkeit*) from the ground of determinate laws. The faculty of understanding with its transcendental laws, particularly the law of causality, is the ground of the former, but not, as Kant puts it clearly, of the latter. An obvious problem comes into play here. The understanding is the only faculty clearly identified as the source of particular laws, but its role is limited to being just the ground of lawlikeness. In order to become acquainted with particular determinations, the understanding must look to experience. Experience in turn offers nothing but *rules*, i.e., contingent regularities—not *laws*, to which necessity implicitly belongs. Kant, however, suggests the following direction of enquiry: we always suppose that the particular, determinate rules we discover in experience are laws, namely that they are necessary. We call them laws "*anticipando*." That is, we anticipate that what is empirically encountered as rule is a necessary law. This solution is problematic, for it raises even more puzzling questions. How can it be legitimate to anticipate the necessity of laws that cannot be confirmed

(*MFNS*, 470). He seems however to back off from endorsing such an idea; see Friedman 1992.

empirically in their universality? If legitimate, what exactly do we need to make such anticipation? And finally, what is eventually the resulting modal status of empirical laws?

Other textual evidence, spanning from the *First* to the *Third Critique*, adds some partially clarifying details to the same direction of enquiry. In the *First Critique*, Kant points out what we need to presuppose:

> Even laws of nature, if they are considered as principles of the empirical use of the understanding, at the same time carry with them an expression of necessity, thus at least the *presumption of determination by grounds that are a priori and valid prior to all experience*. (A159/B198; emphases added)

In the *Critique of the Power of Judgment*, Kant most clearly specifies that the understanding can never cognize the necessity of empirical laws, even though it requires that empirical rules form an "order of nature":

> The understanding is of course in possession a priori of universal laws of nature, without which nature could not be an object of experience at all; but still it requires in addition a certain order of nature in its particular rules, which can only be known to it empirically and which from its point of view are *contingent*. These rules, without which there would be no progress from the general analogy of a possible experience in general to the particular, it must think as laws (i.e., as necessary), *because otherwise they would not constitute an order of nature*, *even though it does not and never can cognize (erkennt) their necessity*. (*CPJ*, 5:184; emphases added)

Recapitulating the main points of the above passages: one must anticipate empirical rules of nature—or "think" them—as laws, for otherwise they would not form an "order of nature," by presupposing that they are determined by "a priori grounds," although the understanding can never actually cognize their necessity. It seems then that the very notion of nature attached to empirical laws compels us to regard them as proper laws, and not as mere empirical regularities. The expression itself 'empirical laws *of* nature' (*empirische Gesetze der Natur*) thus reveals an intrinsic ambiguity already present at the linguistic level. For, to use the classical distinction between types of genitive,

it can be interpreted both as a 'subjective genitive,' according to which nature is, as it were, the legislative subject, and as an 'objective genitive,' according to which instead empirical rules are regarded as laws in order to form an order of nature. The Kantian locution therefore contains a twofold—metaphysical and epistemological—meaning that, as I will show, has raised several interpretative challenges in the literature.

2. The trade-off between cognizability and necessity in interpretations of empirical laws

Various interpretations have been developed in order to account for the necessity of empirical laws in Kant's philosophy. They differ in many crucial aspects: disagreement in fact reigns over which faculty is the true source of necessity; how necessity of empirical laws obtains; and, most importantly, what is a law of nature for Kant. In this section, I will briefly assess virtues and flaws of three major interpretations of empirical laws: (1) the so-called 'Best system' interpretations; (2) Friedman's account (or the 'Derivation account'); and (3) the 'essentialist' account (or the 'Necessitation Account').[9] For the sake of convenience, 1 and 2 will be treated together in the first part devoted to epistemological accounts of laws; 3 will be discussed separately as a metaphysical interpretation. I will argue that these accounts present us with a trade-off between necessity and cognizability of empirical laws of nature, that inadequately captures the full articulation of Kant's position.

2.1 Epistemological accounts of empirical laws

Although different from each other, the so-called 'Best system' interpretations and Friedman's account of empirical laws can be clustered in the same category of epistemological reading of necessity. In both readings, necessity obtains when empirical rules are inserted in epistemic constructions: respectively, the system of reason and the laws of the understanding.

[9] To follow Messina's classification, see Messina 2017.

'Best system' interpreters[10] generally agree that the true source of empirical laws is neither the understanding nor experience, but the faculty of reason.[11] In particular, the necessity of empirical laws of nature is said to result from their being embedded within a system through the unifying function exercised by reason's systematicity. In the Anglophone literature, this line of interpretation was first proposed by Buchdahl. His account of laws highlights the positive function of systematicity and suggests that a kind of "analogical" necessity can be attached to empirical rules when embedded within a system (Buchdahl 1969, 517–8). Although the details of his account remain quite vague, he deeply influenced two important 'Best System' interpreters: Kitcher and Guyer.

Kitcher elaborates a detailed account of how systematicity is supposed to necessitate empirical laws of nature. Kitcher's view is intended to offer a middle ground between two extreme views: on the one hand, a purely metaphysical account of laws, according to which laws "express objective natural necessities" (Kitcher 1986, 201); on the other hand, a "Mach-Duhem conception," according to which science's aim is just to conveniently systematize empirical regularities (ibid., 203). He argues that a belief in an empirical generalization, when taken in isolation, does not constitute knowledge of a law, since induction cannot prove any kind of necessity. But the very same belief can acquire necessity if the generalization plays a "particular role" in an ideal systematization of beliefs (ibid., 210). As he puts it: "laws are statements that play a particular role in the system that would emerge from an ideally extended inquiry" (ibid., 215). What is the exact "particular role" statements are supposed to play? This is not entirely clear, but presumably, statements are supposed to unify lower regularities in a meaningful way. In other words, regularities are considered to be laws because of the 'connecting' role they play in the construction of

[10] Major proponents include Buchdahl 1969, Brittan 1978, Kitcher 1986, and Guyer 1990.
[11] Or reflective judgment as it is presented in the *Critique of the Power of Judgment*. Reason and reflective judgment are problematically interpreted as overlapping faculties in several interpretations of empirical laws of nature. In this chapter, I do not address the problem of the relation between these two faculties, and I focus on reason and Kant's solution in the *First Critique*.

the system itself.[12] An “ideally extended enquiry” is the hierarchic system of laws based on empirical data and guided by the methodological rules that is described in the Appendix to the Transcendental Dialectic and in the introductions to the *Critique of the Power of Judgment*. Necessary laws are therefore, strictly speaking, only the systematized regularities that belong to the ultimate, complete science, even though all statements about regularities that persist in our progressive systematization should be regarded as lawful.

This interpretation is clearly advanced as an epistemological thesis. However, as noted by Kreines, it entails problematic conclusions about Kant’s account of “what it is to be a law of nature” (Kreines 2008, 530; see also Messina 2017, 136). At the metaphysical level, Kitcher has to maintain in a rather Humean fashion that laws are essentially regularities or generalizations.[13] Laws are nothing but the “generalizations that would fit into the best system of empirical knowledge” (Kreines 2008, 530). One might here object that, for Kitcher, systematicity is actually *constitutive* of the necessity of regularities, i.e., it actively necessitates them as laws. But even granted such necessitation, necessity would still remain an ideal epistemological result rather than a “presumption of determination by grounds that are a priori and valid prior to all experience” (A159/B198) What we would end up with is, as it were, a mere ‘epistemological’ necessity, that is a kind of necessitation completely detached from the presupposition of grounds. In other words, nothing would assure us that what works in an epistemological system does reflect an underlying order of nature; or, similarly, that nature is necessarily ordered in accordance with the laws that obtain in our system. To sum up, for Kitcher, the epistemological dimension is made constitutive of, or determines, the metaphysical dimension of laws of nature: we do have knowledge of laws, but their necessity is only epistemologically superimposed upon nature, thus failing to do justice to Kant’s claim that we have to presume determination by a priori grounds.

[12] See also Messina 2017, 135.
[13] One of Kant’s main points against Hume is that regularity does not suffice for necessity. See *Prolegomena*, 4:258.

By contrast with Kitcher, Guyer claims that the inclusion of an empirical hypothesis in a hierarchical system has "some explanatory value and can lend the hypothesis at least an approximation of necessity" (Guyer 1990, 238). Specific empirical laws are subsumed and, so to say, *explained* by generic higher-order laws. However, they do not become absolutely necessary once embedded within a system, because the "system as a whole may be only contingently true relative to possible alternative systems" (ibid.). As a result, Guyer seems to escape the charge leveled against Kitcher regarding the constitutive modal power of systematicity: what systematicity can actually provide us with is just an approximation of necessity, not absolute necessity. However, I do not think such an account can actually amend the flaws in Kitcher's view. First, such hierarchic system of laws would still remain, at the metaphysical level, a system of mere regularities and there would be little difference between Kant's and Hume's accounts of necessity. Secondly, following Stang, Guyer's proposal leaves us without a precise account of how the necessity of the highest-level laws—the laws that lend hypotheses an approximation of necessity—really obtains (see Stang 2016, 232). And yet without such an account it is difficult to see how highest-level empirical laws can possibly explain lower-level laws.

A different account has been developed by Friedman in order to ground the shaky foundations of necessity and give empirical laws a solid anchoring in the a priori forms of cognition. Regularities, Friedman argues, even when systematized, can never acquire an a priori status that satisfies the requirements of necessity and universality that Kant seems to demand for laws in general, and therefore also for empirical laws of nature. Friedman thus claims that the only possible source of a priori necessity of empirical laws must be the understanding itself with its a priori principles, in particular the principle of causality. Friedman's interpretative strategy hence consists in highlighting the foundational role of pure understanding.[14]

Friedman points out that in order to have necessary laws, universal connections among kinds are required. Given that inductive procedures can

[14] See, for example, A195–6/B240–2 for textual support.

"never ground the strictly universal judgment that *all* events of type A are followed by events of type B" (Friedman 1992, 163), we must resort to the principles of the understanding, and in particular to the Second Analogy, to have such a grounding. Regularities are initially contingent, but once they have been subsumed under the principles of the understanding, they acquire necessary status. Empirical laws are therefore a combination of a priori principles and the inductively observed regularities to which those principles are applied.

Friedman distinguishes two steps in the process of derivation according to the distinction of empirical laws in: (i.) laws of matter as such—in particular, its highest law: the inverse-square law of gravitation; and (ii.) laws of different kinds of matter (e.g., chemical laws). Friedman's derivation of necessity goes roughly as follows: once the transcendental principles are specified into metaphysical principles of pure natural science thanks to the addition of the empirical concept of matter,[15] we need to apply the resulting principles to the initially merely empirical, or inductive regularities codified in Kepler's laws. Once this is done, Newton's law of universal gravitation, according to Friedman, results "uniquely and deductively" (ibid., 178). Friedman then extends such grounding to all the manifold of empirical judgments concerning subspecies of matter. Since this manifold is infinite, we can imagine such a grounding for the totality of empirical laws only as the regulative ideal of an unreachable complete science. This is where reason finally enters the picture on Friedman's account. In this case, reason's systematicity serves as a methodological principle that guides the subsumption of all empirical laws into a complete classificatory system. Only when such a classificatory system is completed will the totality of empirical laws receive a complete transcendental foundation. Reason has therefore a very different role from the one it plays in 'Best system' interpretations. As Friedman puts it, it is not supposed "to provide a kind of necessity that the understanding itself cannot provide, but rather to systematize the potentially

[15] A step that, according to Friedman, has the effect of restricting the principles to nonliving material substances and transforming the analogies of experience into the Newtonian laws of motion (Friedman 1992, 182–5).

infinite multiplicity of empirical laws under more and more general empirical laws so as to approximate to the a priori necessity issuing from the understanding and from the understanding alone" (ibid. 190).

A full discussion of the grounding of necessity of the law of gravitation would require an extended digression on the *Metaphysical Foundations of Natural Science* and the status of physics at Kant's time. Here I want just to point out a possible flaw in the idea of mere application of metaphysical principles to inductive regularities, such as Kepler's laws. Friedman seems to take for granted the possibility of identifying such regularities. In the Appendix to Transcendental Dialectic, however, Kant tells a less straightforward story about how such regularities are identified. Regularities—and Kant takes Kepler's laws as the main example—are in fact said to be clustered on the basis of reason's principles of systematic unity: manifoldness, affinity and unity. It is only "under the guidance of those principles," Kant explains, that "we come to a unity of genera in the forms of these paths (the course of the planets), but thereby also further to unity in the cause of all the laws of this motion (gravitation)" (A663/B691). By contrast with Friedman's account, the identification of epistemically relevant regularities, and therefore also the very possibility of applying transcendental principles to them, seems to have a different source than the understanding, namely reason.

More problematic, though, is the extension of this kind of grounding to the infinite manifold of empirical laws. Friedman is careful in trying to distinguish his account from a mere a priori derivation, but to say that the understanding is the only ground of the necessity of all the infinite manifold of empirical laws *is* to say that particular laws are formally necessary. As we saw, however, Kant explicitly denies that the understanding is the ground of determinate laws, and, as noted by Kreines, the fact that the understanding can never cognize their necessity points towards an inevitable epistemic limit rather than a mere quantitative problem of 'extension.'[16] Moreover, even

[16] "Kant's epistemological commitments justify the claim that he in fact makes here: the limit is in principle and ineliminable; our lack of knowledge stems not from the state of science at

conceding that empirical laws can be derived from other laws—the laws of the understanding—, it is still unclear what really necessitates specific processes in nature. As Engelhard puts it, “laws are abstract entities, hence it seems impossible that they can act on concrete spatio-temporal things. Since the laws are not entities in space and time, they cannot be causes. But then, how can they necessitate the ongoings in nature?” (Engelhard 2018, 28).

Like ‘Best system’ interpretations, Friedman’s account of empirical laws has a clear epistemological status. Empirical laws are defined as laws whose knowledge can be derived from the a priori principles of the understanding. According to both views, regularities undergo a modal transformation as soon as they are included in epistemic constructions, and necessity is conceived as the epistemic result of such inclusion. Although successful in assuring (progressive) knowledge of empirical laws, both views provide a kind of necessity that might not faithfully depict Kant’s position. In ‘Best system’ interpretations, the counterpart of a constitutive epistemic necessity is a substantially Humean account of laws. Friedman tries to solve this flaw by reinforcing the a priori source of empirical laws. However, as we saw, his derivation of empirical laws from the understanding does not convincingly explain how determinate processes in nature are necessitated. Broadly speaking, both accounts privilege our epistemic access to empirical laws over a well-grounded origination of necessity.

2.2 Essentialist accounts of empirical laws

In this section, I argue that the more recently developed ‘essentialist’ accounts of empirical laws solve several flaws in previous interpretations in explaining the necessity of empirical laws, although at the high cost of introducing a serious threat to the possibility of empirical cognition. In order to critically evaluate this position, I need to clarify the modal status of particular laws of nature according to essentialists.

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some particular time but from our limited access to a priori intuition, or from ‘the limits of our faculties of cognition’” (Kreines 2008, 541).

Despite many differences among supporters in the details of this account,[17] they all share the same tenet regarding the origin of necessitation of laws. By contrast with other accounts, the essentialist does not try to reduce necessity to a product of our epistemic faculties. Instead, she holds that the necessity of empirical laws is grounded in the essences or natures of things: laws are grounded in the essential properties that belong to the real essences of kinds of things. On this view, to formulate a necessary law of nature "is to identify a kind on whose nature some regularity depends" (Kreines 2008, 528). Only if the essence of the kind is the underlying ground of the law, can a mere 'rule' apply to all possible instances, *necessarily*. As noted by Messina, the essentialist thus adopts a "bottom-up" model of laws, which reverses Friedman's derivation account (Messina 2017, 137). In the latter, transcendental laws of the understanding imply the necessity and existence of empirical laws of nature, as well as necessary connections among kinds. According to the essentialist view by contrast, real essences of kinds ground the very necessity of the causal connections injected by the transcendental laws.

I take this account to better explain the kind of necessity we are looking for in the case of empirical laws of nature. The necessity it provides is neither based on mere regularities nor imposed by our subjective faculties of cognition, but on a kind of nomic necessity, grounded in the reality of things. The essential differences among kinds are not reduced to a mixture of a priori principles and experience, but clearly identified as a distinct source of necessity. Moreover, as Watkins has shown, this reading makes the case for a substantial continuity in Kant's view on laws from the Critical to the pre-Critical texts, where Kant clearly endorses an essentialist view on laws.[18] That's for the metaphysical side of the problem. The epistemological side of this view turns out to be more problematic than it may seem. Of course, even essentialists do not reduce Kant's position to mere metaphysical realism. To

[17] Major representatives of this view include Watkins 2005, Kreines 2008, Stang 2016 and Messina 2017.
[18] See especially Watkins 2005 for a detailed historical reconstruction of the problem. See also Stang 2016.

say that the necessity of laws is grounded in the essences of things is obviously not the same as to say that we can actually know those laws. On the contrary, the essentialist account poses extended limitations on our epistemic faculty, trying to preserve the necessity of empirical laws against an inflated account of knowledge. Paraphrasing a famous Kantian expression, essentialists have to limit knowledge to make room for necessity.[19]

The clearest and most influential account of our epistemic limits regarding empirical laws is the one proposed by Kreines.[20] According to his reconstruction, there are necessary laws, but we are prevented from knowing them. Knowledge of necessity in fact requires a priori knowledge, which in turn requires a priori intuition. But as we saw in the *Metaphysical Foundations*, such a priori intuition is not available for empirical laws of nature. As a result, their necessity cannot be knowable by us. The only exception is represented by the laws of mechanics since they concern a single kind (matter) that stands in close connection with our pure intuition of space (see Kreines 2008, 540–3). The remaining infinite manifold of laws constitutes in its necessity an inaccessible realm for our knowledge, so that we can never be sure whether we have identified a law of nature instead of a mere regularity. As Stang puts it:

> Even if it is a law that p and we know that p, we will typically not know what it is about the relevant natural kind in virtue of which p obtains. We will lack insight into the necessity of this law. (Stang 2016, 258)

Except for the laws of mechanics, the essentialist account has therefore to either deny the possibility of empirical knowledge of laws or to resort to other sources—namely, reason and systematicity—to allow for some form of empirical cognition. For Kreines, reason's systematicity, that is the ideal of systematic unity through which we order and classify regularities, serves to

[19] This characterization applies particularly to Kreines 2008, Stang 2016, and Messina 2017. It is unclear whether Watkins 2005 agrees with them regarding the unknowability of empirical laws.
[20] Similar considerations can also be found in Watkins 2005, Stang 2016, and Messina 2017.

“think as laws the empirically known rules” (Kreines 2008, 537). And the only reason we do so is that otherwise we would make “no progress in our investigation of the particularities of nature” (ibid.). These rational sources, however, do not change the modal status of the regularities we encounter in experience. Empirical enquiry can only “approximate to knowledge of the sort of universality that it seeks” (ibid., 538). But, as I will argue, this solution opens up new problems that essentialists do not fully acknowledge. As noted by Breitenbach, if reason’s systematicity is an unreachable ideal that never really brings us to laws of nature, it is doubtful that empirical cognition of laws and empirical progress are possible at all (see Breitenbach 2018, 117). In other words, it is unclear how regarding mere regularities as laws would help us acquire and improve cognition of them.

Before expanding such critique and proposing a solution, let me end this section with a brief overview on the various interpretations I have so far analysed. No matter which interpretation we opt for, we will have to face a trade-off between necessity and cognizability of empirical laws. Following epistemological interpretations, we can keep knowledge of laws, but forego any solid grounding of necessity. By contrast the essentialist view identifies the kind of necessity we need for empirical laws, but at the cost of sacrificing the cognizability of laws. This trade-off, however, seems to find no place in Kant’s philosophy. Kant never portrays his idea of necessity in Humean fashion (indeed his opposition to Hume underlies his treatment of causality in the *Critique*), nor does he speak of empirical laws as mere regularities that we have no hope to approximate to necessity. Is there a way to maintain a grounded metaphysical necessitation of laws without undermining the very purposiveness of empirical enquiry, namely an enquiry in which both empirical cognition and progress have their place? I argue that a more in-depth analysis of Kant’s notion of reason is the key to reconcile the epistemological and the metaphysical side of the problem of empirical laws of nature.

3. Purposiveness of science: reconciling necessity and cognizability of empirical laws

Essentialist interpreters deny any kind of epistemic access to empirical laws as such and replace it with a mere assumption for the sake of progress in science.[21] However well supported, this claim must be questioned, for it implicitly undermines the very purpose of scientific enquiry. On Kreines' account, the only empirical laws that we are able to formulate with necessity are the laws of mechanics because of their very special status (i.e., only in their case we do have a priori intuitions that complement our concepts). All other empirical laws are regarded as laws, but they remain strictly speaking mere generalizations. It is fairly evident that the essentialist account has delivered less than expected. It is true that we have finally reached a clear understanding of the origin of necessity, but as regards our empirical enquiry and the basic presumption of necessity under which we can carry out the enquiry itself, we have not gone one single step further. What we have ended up with is a mere ensemble of regularities that are inexplicably said to approximate a kind of necessity that, however, lies beyond the boundaries of cognition. But how can we even admit such an approximation, and therefore an actual progress in our scientific enquiry, if we do not know whether these rules actually reflect nature, and the enquiry itself is made possible only on the basis of an assumption made for the sake of convenience?

The problem is well rooted in Kant's ambiguities regarding the cognizability of empirical laws. Although he explicitly denies fully-fledged knowledge of the necessity of empirical laws to the understanding, he never claims that we cannot aim to cognize empirical laws.[22] Instead, he seems to allow for a form of cognizability of the real essences in which empirical laws

[21] Stang does recognize that the assumption that there are laws constitutes not just a heuristic assumption, but a very condition of possibility for empirical enquiry (see Stang 2016, 241 and 259). However, on his account, the latter represents an additional problem that can be independently addressed, whereas I will argue that the essentialist account of laws is strictly dependent on certain assumptions provided by the faculty of reason.

[22] See Willaschek and Watkins 2017 for Kant's technical conception of 'knowledge.' For Kant, knowledge "is a kind of assent to a judgment that requires consciousness of a sufficient epistemic ground" (Willaschek and Watkins 2017, 83). Since we lack sufficient epistemic ground with respect to judgments concerning empirical laws, we cannot, strictly speaking, 'know' empirical laws of nature.

are grounded. Take for instance this passage from his lectures on metaphysics:

> The real essence is not the essence of the concept, but rather of the thing (*sondern der Sache*). E.g., the predicate of impenetrability belongs to the existence of body. Now I observe through experience much that belongs to its existence; e.g., extension in space, resistance against other bodies, etc. Now the inner ground of all this is the nature of the thing. We can infer the inner principle only from the properties known to us; therefore *the real essence of things is inscrutable to us, although we cognize many essential aspects. We become acquainted with the powers of things bit by bit in experience*. (*ML*$_2$, 28:553; emphases added)

The real essence is defined as the essence of the thing. This is nothing more than an analytical definition: the word 'real' comes from the Latin *res*, meaning 'thing.'[23] Now, since Kant illustrates the real essence using the "existence of body" as an example, he also has to restrict his definition from things in general to existing things; the real essence of existing things is properly called "nature."[24] But what is remarkable about this passage is the way Kant talks about the cognizability of the "nature of the thing": even though real essences of things remain "inscrutable to us," we may "cognize many essential aspects" of them. Note that Kant is mentioning essential aspects—not regularities we happen to classify together (i.e., accidental generalizations); from these essential aspects, and only from these, we can infer natures of things. Experience progressively ("bit by bit") reveals to us the natures of things.

Even if this passage seems to allow for the possibility of cognizing aspects of real essences, our doubts have now been increased rather than diminished. For how can we legitimately cognize essential aspects of an inscrutable essence in experience? How can we know that those aspects are

[23] Kant for example writes: "each thing is reality. Thingness, so to speak, rests merely on reality" (*ML*$_2$, 28:560).
[24] In the *Metaphysical Foundations*, Kant adds that, given his definition of real essence, "one can attribute only an essence to geometrical figures, but not a nature (since in their concept nothing is thought that would express an existence." (*MFNS*, 4:467 fn.) As Stang shows, however, real essences and natures are synonyms if we focus on existing things (see Stang 2016, 240). See also Massimi 2017 on this distinction.

indeed essential, and not accidental generalizations? In other words, if the necessity of empirical laws lies in the essences of different kinds, how can we get to know essential aspects of different kinds in a reliable way? And how can we presume their necessity even though we can never fully grasp their essences?

Answering these questions, I contend, requires complementing the essentialist account of empirical laws of nature with an in-depth analysis of the epistemic resources that theoretical reason offers us. In the rest of this chapter, I will show that reason's systematicity plays a crucial role in reconciling the necessitation of empirical laws with a progressive, albeit fallible, cognition of them. In particular, it allows us to respond to two epistemic quandaries that the standard essentialist account fails to address.

The first epistemic quandary is the following: what entitles us to regard rules as laws in order to further the empirical investigation of nature? This is a fundamental worry for an essentialist, although it is largely neglected in the existing literature. If we cannot have knowledge of empirical laws, it is unclear why we should regard rules as laws and attempt to acquire cognition of laws. After all, we would have no way to tell that we are acquiring relevant empirical cognition, nor would we have a clear goal for investigation. In fact, a skeptical position that simply denies that there is such a thing as empirical cognition of laws would seem more consistent with the epistemic constraints of essentialism. In order to answer this challenge, an essentialist should make room for some form of epistemic access to essences, but it is unclear how this access would be compatible with Kant's own restrictions about the knowability of empirical laws.

The second, closely related epistemic quandary concerns the very notion of approximation and progress in empirical investigation. For even if we grant some form of epistemic access to essences, it is still unclear how our investigation can approximate to necessity. If the real essence is ultimately inaccessible to us, it seems to follow that our inquiry will not only never reach it (something which is consistent with Kant's account) but will

also fail to get any closer to it. Yet this is precisely what the Kantian notion of approximation requires of empirical investigation.

Both epistemic quandaries, or challenges, seem to jeopardize the possibility for human cognizers to acquire empirical knowledge of laws and approximate to necessary laws. But I contend that Kant's account of reason has internal resources to address these challenges. In the Dialectic, Kant famously reconstructs reason's natural tendency to answer metaphysical questions and go beyond the boundaries of possible cognition. But the Dialectic also contains a positive doctrine that transforms reason's natural tendency of reason into an indispensable *epistemic* resource for empirical investigation. In the following section, I show, first, how it is possible to apply Kant's considerations on reason to the problem of empirical laws of nature. And second, I argue that reading this problem through the lenses of the Dialectic allows us to reconcile the metaphysical question of the necessitation of laws with a robust sense of empirical cognition and progress. In other words, I provide an interpretative framework that accommodates two apparently incompatible tenets of Kant's philosophy of nature, namely that we cannot know empirical laws, but that we can improve our cognition of them.[25]

I will proceed as follows. First, I will present reason's general function of guiding the understanding and making its use purposive. I will then apply Kant's arguments to the present debate concerning the cognizability of real essences. This application, in turn, will allow us to answer the above-mentioned epistemic challenges to the essentialist account. In particular, I will show that thinking of real essences as ideas of reason gives us epistemic

[25] It is true that, following Willaschek and Watkins 2017, we can technically have cognition of something without knowing it, and vice versa. Knowing something means having sufficient epistemic ground to assert that it is true—as such, it has clear epistemic value. In their standard meaning, cognitions are instead mere "conceptual determinations of a sensibly given object" (Willaschek and Watkins 2017, 83)—as such they do not necessarily have epistemic value. However, it is far from obvious how mere cognitions can be *insightful* or can be *improved* if we cannot possibly know the object. In fact, Kant does mention a more restricted notion of cognition as "having insight into" (*perspicere*) which I take to be more relevant to the present discussion than the standard, non-epistemic meaning of 'cognition'; see, e.g., *Jäsche*, 9:65. For an interesting distinction between fully-fledged 'knowledge' and epistemically valuable 'cognition' of empirical laws, see Breitenbach 2018.

access to what Kant calls “comparatively” inner properties, i.e., properties that have ontological and epistemic priority over mere regularities (or accidental generalizations). And second, that we can make sense of empirical progress in science only if we conceive of essences as unreachable totalities of empirical conditions rather than unknowable things in themselves. As a result, empirical laws transcend our cognition in degree rather in kind, and are in principle object of progressive, yet fallible knowledge.

4. The prescriptive value of the systematicity of reason in general

I wish to start my discussion with a preliminary account of the most general level at which reason, and in particular, reason’s idea of systematicity, is relevant to the empirical investigation of nature. In the Appendix to the Transcendental Dialectic, Kant writes:

> Reason never relates directly to an object, but solely to the understanding and by means of it to reason’s own empirical use, hence it does not create any concepts (of objects) but only orders them and gives them that unity which they can have in their greatest possible extension, i.e., *in relation to the totality of series*; the understanding does not look to this totality at all, but only to the connection through which series of conditions always come about according to concepts. Thus *reason really has as object only the understanding and its purposive application*, and just as the understanding unites the manifold into an object through concepts, so reason on its side unites the manifold of concepts through ideas by positing a certain collective unity *as the goal of the understanding’s actions*, which are otherwise concerned only with distributive unity. (A643–4/B671–2; emphases added)

Reason’s ‘object’ (in the broad sense) is the understanding itself, and reason finds its proper empirical use by applying itself to it. As Kant puts it, reason’s function is not to create concepts of objects, but to guide the understanding and make its use “purposive.” Since Kant is here referring to the empirical investigation of nature, reason serves to give a purpose or goal to the

understanding's actions while investigating nature. But what is this purpose or goal? And what does it imply for the necessity of empirical laws of nature?

The text of the Appendix is reminiscent of the Dialectic's terminology. The epistemic goal that reason sets up for the understanding is the "totality of series." "Totality of series" (or "absolute totality of the series of conditions," see, e.g., A327/B384) is a technical term that Kant presents and discusses in the course of the Dialectic. Roughly speaking, reason is not satisfied with the connections between particular conditions that the understanding has to do with (e.g., particular causes, spatial parts, contingent objects, etc.; see, e.g., Willaschek 2018, 74). All such particular conditions are not satisfactory for reason because each of them, in turn, depends on further conditions in order to be possible—as such they fail to offer ultimate answers to our investigation. On Kant's account, reason thus naturally demands something that is ultimately explanatory and not itself conditioned: the unconditioned, or the absolute totality of conditions.

Kant spells out this epistemic goal in terms of systematicity or systematic unity of cognition. If we get to know the totality of conditions, the series of conditions connected by the understanding no longer constitute a chaotic aggregate, but a unified system of cognitions in which the "whole" precedes its "parts" (A645/B673). In fact, for Kant, systematic unity is what defines science proper or science in the strict sense (see A832/B860; *MFNS*, 4:468), namely, a body of cognition that is not merely the result of induction but is apodictically certain and, as such, deserves the full title of 'knowledge.' If such scientific ideal is realized, a key modal change with respect to our cognition of empirical laws of nature occurs. A proper science is not a mere "contingent aggregate" of regularities, but a "system interconnected in accordance with necessary laws" (A645/B673). In other words, necessary laws of nature are the ultimate mark of a complete science, namely a science for which reason's demand for the "unconditioned" or "totality of conditions" has been completely fulfilled.

But how can such system form once we take into account the limitations of our cognition? As Kant argues in the course of the Dialectic, the

absolute totality of conditions lies beyond the possibility of experience and, as such, can never be cognized. Kant's argument hinges upon the constitutive limitation of cognition to 'empirically conditioned' conditions, or conditions that are given in space and time: "with all possible perceptions, you always remain caught up among *conditions*, whether in space or in time, and you never get to the unconditioned" (A483/B511). Since we can only experience objects under the conditions of space and time, we simply can never obtain something that is absolutely independent of such conditions (see A494/B522). In other words, our spatiotemporal experience can never give us something like a view from nowhere on nature. While this limitation clearly explains why we cannot get to unconditioned conditions, or conditions that abstract from the spatiotemporal conditions under which we necessarily experience objects, it is less clear what it implies when the totality of conditions is represented by an infinite series of empirical conditions (the infinite series of spatial parts or past moments of the world, for example). Even in this case, Kant argues, the totality of conditions remains beyond our cognitive capacities, for even if each particular condition forming the series can be perceived, their "absolute whole"—as an *infinite* complete series—cannot be given to us in our limited experience (see A484/B512).[26]

If a systematic unity of cognition can never be achieved, it also follows that we are never able to obtain a complete corpus of knowledge "interconnected in accordance with necessary laws" (A645/B673). So far, Kant's Dialectic seems to confirm the skeptical scenarios that result from the standard essentialist account of empirical laws. But there is more. For Kant, the same rational resources that lead us to postulate unreachable totalities of conditions acquire an indispensable value with respect to empirical investigation. Although we cannot claim knowledge of the absolute totality of conditions, the latter becomes an *idea* that regulates the understanding and its acquisition of cognition.

[26] "Appearances require to be explained only insofar as their conditions of explanation are given in perception, but everything that can ever be given in it, taken together in an absolute whole, is not itself any perception. But it is really this whole for which an explanation is being demanded in the transcendental problems of reason" (A483/B511). See also Willaschek 2018 and Watkins 2019, especially chapter 10.

> The absolute totality of the series of these conditions in the derivation of their members is an idea which of course can never come about fully in the empirical use of reason, but nevertheless serves as a rule for the way we ought to proceed in regard to them: namely that in the explanation of given appearances (in a regress or ascent), we ought to proceed *as if* the series were in itself infinite, i.e., proceed *in indefinitum*. (A685/B713)

As an idea of reason, the absolute totality of conditions has an eminently *prescriptive* value. Its function is to tell the understanding how we *ought* to proceed with respect to the series of conditions: namely, to always look for further empirical conditions and never take the series as completely or absolutely given in experience. Indeed, since such complete series of conditions cannot be given to us, Kant warns against using this idea to "think the totality in the object as real"; rather, we should use it as "a *problem* for the understanding, thus for the subject in initiating and continuing, in accordance with the completeness of the idea, the regress in the series of conditions for a given conditioned" (A508/B536). In other words, reason prescribes systematic unity (or the totality of conditions from which such unity results) as the goal of the actions of the understanding. Such goal, however, should not be used to ground true claims about *real objects*.

The prescriptive value of ideas allows a preliminary reply to the first epistemic challenge I mentioned earlier: what entitles us to regard rules as laws? Or, more generally, to postulate that nature is systematic? The systematicity of nature seems to be an ad hoc assumption that we subjectively stipulate in order to justify our procedures. For example, we may stipulate that a well-embedded rule—e.g., that gold dissolves in aqua regia—is really a law of nature. But if we cannot obtain knowledge of laws, this seems indeed an arbitrary and unjustifiable stipulation. As prescriptively valid rules, ideas of reason do not face such objection. Assuming systematic unity of nature is valid not because it sufficiently grounds knowledge of true laws of nature, but because it directs our understanding to systematize relations among given conditions and discover potentially lawful rules (such as, 'gold dissolves in aqua regia'). As a result, we ought to proceed in accordance with

the ideas of reason, regardless of whether discovered regularities are indeed laws of nature. In other words, reason gives a “purpose” to empirical investigation by allowing us to *look for* systematic relations in nature.

This is not, however, a sufficient answer to the above-mentioned challenge.[27] It is still not clear what the systematic unity of reason entails for our search of empirical laws and what sense of empirical cognition it affords. Without enabling some form of cognition (or giving us some access to essences, to use the essentialist vocabulary), the prescriptive value of reason would not be particularly helpful—it would only prescribe us to constantly look for further systematic relations among regularities. We need to look more closely at how ideas of reason can be applied to essences, and what this implies for the cognizability of empirical laws of nature.

5. Real essences qua ideas of reason

I now wish to apply Kant’s general points about reason and its ideas to the specific problem of the cognizability of real essences. Although Kant does not particularly elaborate on such application, he offers several clues in the Appendix and other texts that suggest that this is not only a plausible, but an essential part of his doctrine of empirical investigation. I contend that, although real essences cannot be known, they can be thought of as ‘ideas of reason’ in Kant’s technical sense of the term. As ideas of reason, real essences direct our investigation of empirical laws of nature and provide us with a robust sense of empirical cognition.

As we saw, reason’s idea of systematicity has an eminently prescriptive value. Properly speaking, reason’s concepts, or ideas, are not concepts of objects—the absolute totality of conditions can never be given to us in experience and, therefore, we are not allowed to take them as concepts of real things. Ideas are rather prescriptive rules that guide the use of our understanding:

[27] Contra the ‘standard’ essentialist view; cf. Kreines 2008, 536–7.

> One cannot properly say that this idea is the concept of an object, but only that of the thoroughgoing unity of these concepts, insofar as the idea serves the understanding as a rule. Such concepts of reason are not created by nature, *rather we question nature according to these ideas, and we take our cognition to be defective as long as it is not adequate to them*. (A645/B673; emphases added)

In this and other passages, Kant emphasizes the a priori origin of ideas. Since no empirical object can be given to us that matches our rational concepts, ideas cannot be derived from experience. Rather, ideas are a priori concepts of reason according to which we first investigate nature. In other words, ideas are to be thought of as *standards* of empirical cognition. Among the various ideal standards Kant discusses in the course of the Appendix, Kant includes ideas of particular elements and powers, such as "pure earth," "pure water," "pure air," and "fundamental power," to exemplify how reason proceeds towards the acquisition of a "system interconnected in accordance with necessary laws" (ibid.). In Kant's words:

> Admittedly, it is hard to find *pure earth*, *pure water*, *pure air*, etc. Nevertheless, concepts of them are required (though as far as their complete purity is concerned, have their origin only in reason) in order appropriately to determine the share that each of these natural causes has in appearance; thus one reduces all materials to earths (mere weight, as it were), to salts and combustibles (as force), and finally to water and air as vehicles (machines, as it were, by means of which the aforementioned operate), in order to explain the chemical effects of materials in accordance with the idea of a mechanism. For even though it is not actually expressed this way, it is still very easy to discover the influence of reason on the classifications of students of nature. (A645–6/B673–4; see also A649/B677)

Kant's examples of ideas of empirical elements have long attracted attention since, despite their fundamental role in determining—to use Kant's words—"the share of natural causes" and "explaining the effects of materials," they seem to have no clear status in the *Critique*. In particular, if we combine the a priori origin of ideas with the empirical nature of these substances, we seem to end up with a sort of (rather implausible) innatism. It may seem that, according to Kant, we are born with a bunch of particular ideas according to

which we investigate nature. But I think Kant's position can be clearly differentiated from innatism.[28] I take Kant to be saying that we necessarily investigate nature through rational concepts that have no empirical origin with respect to their "purity." Such concepts can be obtained if we apply reason's demand for the totality of conditions to particular sets of given appearances. Take the example of "pure water": we do not need to be equipped with this idea from birth, rather reason produces this idea by thinking the complete totality of particular instances of water. In other words, by applying the idea of absolute totality to particular appearances, we derive a pure concept that have no empirical counterpart.[29]

This peculiar a priori status, however, still does not clarify the function of ideas with respect to the empirical laws of nature. How would ideas of particular substances or powers contribute to the formation of a system of empirical laws? I argue that ideas of reason allow us to think real essences as ideal limits of inquiry. More specifically, I contend that although real essences cannot be known as objects, they play—*qua ideas*—a fundamental epistemic role in empirical investigation. In order to substantiate these claims, I need to go back to Kant's treatment of real essences in his lectures on logic and metaphysics.

As we saw, according to the broadly 'essentialist' account of laws presented in this chapter, the real necessity of empirical laws must be grounded in essences or natures of things that are beyond the boundaries of empirical cognition. Kant, however, famously distinguishes between the 'unknowable' real essence of an empirical object and its epistemically

[28] Kant explicitly distances himself from the "exaggerated expression" of Plato's theory of innate ideas, see A318/B374–5. Moreover, Kant frequently denies that there are innate concepts (see, e.g., *Discovery*, 8:221; *Mrongovius*, 29:763). For a critical discussion of innatism in Kant, see Vanzo 2018.

[29] This line of interpretation is supported by Kant's description of the genesis of the psychological idea in the second part of the Appendix. Such idea—as the "concept of a simple, self-sufficient intelligence"— results from "thinking (the empirical unity of all thought) unconditionally and originally" (A682/B710). In short, reason produces the idea of the soul in order to systematize a specific set of appearances, namely inner appearances (see Kraus 2018, 82, for a detailed discussion of this passage). Although particular ideas (such as ideas of chemical elements) clearly differ from the 'official' idea of the soul, I suggest that they result from analogous attempts to systematize sets or subsets of appearances. Of course, this is only the sketch of a full reconstruction. Unfortunately, I do not have the space to discuss it in more detail here.

accessible logical essence. The logical essence of an empirical object is the "subjective basic concept" of the thing (*Blomberg*, 24:116). It contains the predicates or marks that we use to distinguish the thing from all the others (*Jäsche*, 9:143). As such, the logical essence is changeable and incomplete. For example:

> The concept that water is a fluid element, without odor or taste, 14 times lighter than quicksilver, etc., is the logical essence of water [;] for if I have mastered physical cognitions about something, then I think of all this as soon as I mention the word water. From this, of course, I cannot at all derive all the remaining properties which are determined for water, and which belong to it or can belong to it, and perhaps are not yet all discovered, although we do not always think them in this connection [;] consequently it is not the real essence. (*Blomberg*, 24:118)

By contrast with the merely subjective logical essence, the real essence is defined by Kant as "the first inner ground of all that belongs to the possibility of a thing" (*Mrongovius*, 29:820). This definition poses the following interpretative challenge. If the real essence of an instance x is the ground of the possibility of x, one may think that such ground is other than x itself (for example, God or some distinct entity). Following Stang, however, this does not seem to be the case—a clear counterexample being the fact that, for Kant, the real essence of matter includes the power of attraction.[30] The real essence of x is rather the "inner character of x that explains its manifest character and its relation to other things, so the real essence is not some entity distinct from x" (Stang 2016, 235). To give Stang's definition:

> Where K is a kind (the appropriate target of a real definition) and *x* is a possible instance of that kind, the real essence of K is the complex of properties possessed by *x* that ground *x*'s being an instance of kind K. (Stang 2016, 235–6)

According to this definition (well-supported by textual evidence),[31] the real essence of a sample of water, for example, is not something other than such

[30] See, e.g., *Blomberg*, 24:117.
[31] For example, in the above-mentioned passage from the *Blomberg Logic* (24:118) Kant says that the logical essence is not the real essence precisely because it does not contain

sample. It is rather the complex of inner or essential properties possessed by this sample that makes it case that it is a sample of water.[32] The real essence of an instance x of a kind K can be expressed as follows:

x possesses [P1+ P2 + P3 + …][33]

As we know, the real essence, and therefore the complex of properties that composes it, cannot be known. From the fact that the real essence cannot be known, however, it does not follow that this concept does not play any epistemic role. In fact, the logical essence can hardly represent a goal for scientific investigation. When investigating nature, we cannot be satisfied with subjective concepts that only allow us to distinguish a thing from the others and may have no objective counterpart. The goal of scientific investigation is rather to infer fundamental properties from the manifest ones, and therefore to approximate our logical essences to real essences. As Kant puts it:

> He who wants to find the real essence must be acquainted with all the marks that belong to the thing constantly. Then he must search further for the ground of these,

"all remaining properties." Kant explicitly says that the totality of properties constitutes the essence of a thing (see, e.g., *Vienna*, 24:919); and "complex" of properties or essential properties is a Kantian term (see, e.g., *Mrongovius*, 29:820). One may wonder if this definition is compatible with the idea that the real essence is a "first inner ground." Kant, however, seems to equate these two definitions in several passages (see, e.g., *Dohna*, 4:760; *Vienna*, 24: 919–20; *Mrongovius*, 29:820). I therefore agree with Stang 2016 that, for Kant, "the first inner ground of all that belongs to the possibility of a thing" is the "complex" of essential properties possessed by that thing. For a similar interpretative strategy, see also Langton 2018.

[32] Following Baumgarten, Kant distinguishes between properties that are part of the real essence as grounds (essential properties; *essentialia*) and properties that only follow from the real essence as consequences (attributes; *attributa*); see, e.g., *ML*$_2$, 28:552–3; *Mrongovius*, 29:820). Properly speaking, the real essence only contains essential properties.

[33] Kant's definition of real essence as a complex of essential properties seemingly differs from the contemporary 'Putnamian-Kripkean' reading of essentialism. According to this reading, for example, the real essence of water is H_2O—one would not say that the real essence of water is the combination of essential properties (say, H_2O, being a liquid, having viscosity, etc.). It goes beyond the scope of this chapter to determine whether Kant's essentialism is compatible with contemporary views. Let me note, however, that Kant's definition of real essence does not imply a 'descriptivist' view according to which the real essence is nothing by the sum of readily observable qualities. Quite the contrary, the essential properties that compose the real essence can be progressively determined only through ongoing, scientific investigation.

> and must endeavor to investigate them, and this is the real essence, then. (*Blomberg*, 24:118)

I contend that we here find a particular case of reason's demand for the totality of conditions. Our questions about the grounds of empirical laws would be answered only if acquainted with all the properties that belong to the thing constantly (P1, P2, P3, etc.), but such acquaintance goes beyond the possibility of our experience. The complex of (potentially infinite) properties thus represents the particular "totality" or "series" that reason attempts to complete:

totality of conditions: [P1 + P2 + P3 + …]

I can now fully apply the reconstruction of reason and its ideas in the previous section to the present case. Although the totality of properties that make up the real essence cannot be known, the idea of such totality serves as a rule for the empirical investigation of nature. As we saw, ideas prescribe us to look for further empirical conditions and to never take the series of conditions as completely given. I suggest that, in the case of ideas of particular essences, such as the ideas of chemical elements or of fundamental power, reason tells the understanding to constantly search for and revise inner properties of empirical objects "as if the series were in itself infinite" (A685/B713). In other words, real essences—qua ideas of complete series of properties—give direction to the empirical investigation of nature by providing indispensable standards that we attempt to approximate.

6. Epistemic access to comparatively inner properties

The suggested account of real essences should give us a better sense of what empirical cognition amounts to in this context. As we just saw, ideas of real essences are the prescriptive rules that allow us to constantly enrich and revise the logical essences of empirical objects. But there is another, often neglected distinction that can help us clarify such constant enrichment and revision: the distinction between absolutely and comparatively inner

properties. This distinction has been not particularly highlighted in the literature, but as Warren has pointed out, it plays a more important role than generally acknowledged. Here I want to suggest that it plays a key role in understanding the kind of epistemic access we have to the essences that ground empirical laws.

I showed that the real essence is the complex of inner properties of an empirical object, and that such complex is demanded by reason as the absolute totality of a given set of conditions. Now, although such absolute whole is not an object of experience, and therefore knowledge, Kant does allow for epistemic access to wholes of conditions as long as they are "comparative" (rather than absolute), namely, if they represent empirical totalities, or totalities in comparison to particular conditions.[34] More to the point, Kant argues that inner properties can be cognized if they are "comparatively inner." As pointed out by Warren, Kant does not propose an "unqualified rejection of the rationalist claim that we are able to characterize an object through its inner properties, i.e., that inner properties figure in knowledge" (Warren 2001, 46). Rather, he argues that inner (i.e., essential) properties of objects can be known if they are given to us in experience, and therefore in terms of external relations: in Kant's words, "I have therefore nothing that is *absolutely,* but only *comparatively* internal, which itself in turn consists of outer relations" (A277/B333; see also A285/B341). We find the same distinction applied to the concept of essence in the lectures on metaphysics. Although we cannot know the real essence completely, we can call something a real essence "comparatively": a comparatively real essence is what human beings can undertake to show of a complete real essence "through experience."[35]

I argue that ideas of real essences are crucial to empirical cognition inasmuch as they give us epistemic access to comparatively inner properties (the properties that make up comparatively real essences). By acting as

[34] "The whole in an empirical signification, is always only comparative" (A483/B511).
[35] "But what human being wants to undertake to show the whole real essence of things which are given through experience? We can call something the real essence comparatively, or we can stop with the investigation of the real essence in a certain respect, and with that be content" (*Mrongovius*, 29:821).

rules, they provide the standards according to which we infer comparatively fundamental properties from the manifest ones we encounter in experience, and progressively approximate the real essences of given appearances. For one thing, Kant explicitly specifies that ideas of reason "concern not merely the things, but even more the mere properties and powers of things" (A662/B690). For example, ideas of reason allow us to infer that the orbits of planets are elliptical (ibid.). Moreover, the comparative/absolute distinction figures in the example Kant discusses most extensively in the Appendix, namely the idea of fundamental power—what I take to be the idea of the totality of series with respect to the various appearances of powers.[36] This idea does not provide us with cognition of the fundamental power as a real object. However, it prescribes us not to be satisfied with the variety of powers we encounter in experience and to look instead for their fundamental unity:

> The more appearances of this power and that power are found to be identical, the more probable it becomes that they are nothing but various expressions of one and the same power, which can be called (comparatively) their *fundamental power*. One proceeds in just the same way with the rest of the powers. These comparatively fundamental powers must once again be compared with one another, so as to discover their unanimity and thereby bring them close to a single radical, i.e., absolutely fundamental, power. But this unity of reason is merely hypothetical. (A649/B677)

I take this passage to mean that the idea of fundamental power allows us to look for comparatively fundamental powers in experience. The idea is almost empty because it does not specify which fundamental powers really obtain in nature, nor does it entail that there is such a thing as an absolutely fundamental power in nature.[37] At the same time, however, it provides us with a precise and epistemically fruitful standard for the discovery and constant revision of empirical powers in nature.

[36] Note that Kant uses the terms 'properties' and 'powers' in a similar way when talking about essences.
[37] For an analysis of the emptiness of ideas of reason with a particular focus on the three transcendental ideas, see Zuckert 2017.

If this reconstruction is correct, we can finally offer an answer to the first epistemic challenge raised above, namely how we can make sense of empirical cognition without being able to fully realize the ideal of systematicity of nature. Real essences should be regarded as ideas that afford us epistemic access to inner properties (or powers) that further our empirical cognition of essences. Crucially, comparatively inner properties (or powers) can figure in knowledge (in a broad sense, i.e., epistemically valuable empirical cognition). They can be part of knowledge because they are themselves empirical or given to us under the conditions of space and time. But at the same time, they are more 'fundamental' than mere regularities or accidental generalizations because they are assumed and investigated in accordance with rational ideas. In other words, the standards or criteria offered by reason allow us to look for what *conditions* the particulars that are given to us. Such conditions have, to use Warren's terminology, "ontological" and "epistemic" priority over the conditioned appearances we start with (Warren 2001, 51–2). Take comparatively fundamental power: such power has a clear ontological priority over the powers it unifies inasmuch as it conditions them (or produces them as effects) rather than being conditioned by them. As Kant puts it with respect to properties, although comparatively inner properties are only empirical relations, "there are among these some self-sufficient and persistent ones, through which a determinate object is given to us" (A285/B341).

Ontologically prior conditions possess key epistemic value. For to cognize comparatively inner properties means to be able to *explain* the conditioned particulars as their effects.[38] As Kant puts it with respect to chemical ideas, we reduce different appearances to pure water, pure earth, and pure air to "explain the chemical effects of materials in accordance with the idea of a mechanism" (A646/B674). Kant is not saying—implausibly—that, e.g., the idea of pure water is in itself explanatory, or that we can use an

[38] Being able to explain something as an effect or "according to its grounds" is what defines the particular type of *rational* cognition that Kant briefly mentions in his lectures on logic, namely "*having insight* (*perspicere*)"; see *Dohna*, 24:731, and *Jäsche*, 9:65.

idea to directly explain natural phenomena.[39] Rather, I take him to be saying that in accordance with such an idea, we can discover "higher" empirical conditions (i.e., properties) that we can use to explain various appearances of water (A564/B592). More generally, ideas allow us to infer hypotheses about empirical properties which, if true, would best explain the mechanical effects we see.[40]

This reconstruction allows to steer a middle course between the skepticism that seems to result from the essentialist account of laws and metaphysical knowledge of essences. Kant's position is not that we have no insight whatsoever into the essences of things and their laws. Nor is he saying that we do have epistemic access to essences as such. Real essences should be regarded as mere ideas that do not afford us knowledge of them as objects. As rules, however, they allow us to assume comparatively inner properties (or powers) that, although empirically conditioned, are ontologically and epistemically more robust than mere regularities. Consequently, ideas play a crucial role in making our empirical cognition converge towards systematic unity, namely a "system interconnected in accordance with necessary laws" (A645/B673). As such, this interpretation accommodates two apparently incompatible intuitions that underlie Kant's philosophy of nature, namely that we cannot know laws of nature, but that we can improve our cognition of them.

7. Asymptotic approximation to necessity

As anticipated, there is a second challenge that may undermine the project of approximation to empirical laws of nature. While the prescriptive role of reason and the distinction between absolutely and comparatively inner properties should have given us a better understanding of the possibility of empirical cognition, it is still unclear how such cognition can actually

[39] Kant explicitly rejects the idea that ideas have a direct explanatory role with respect to appearances. See my discussion of this problem in Chapter 1 (in particular, 4.1).
[40] In contemporary terms, one might say that reason's ideas ground practices of IBE (inference to the best explanation) with respect to the properties that constitute real essences and thereby ground empirical laws.

represent an improvement towards knowledge of necessary empirical laws. Since the absolute totality of conditions can never be obtained, how can our cognition get any closer to such necessity? To put it briefly, if essences lie beyond our cognition, it seems to follow that any attempt to approximate to necessary empirical laws is bound to fail. Indeed, many commentators take real essences as unknowable things in themselves. But I argue that this is a dubious equation when talking about real essences of empirical objects. I will show that this is not Kant's view and that the fundamental epistemic limitation that forbids full knowledge of laws lies elsewhere. In particular, I suggest a possible interpretative solution according to which empirical laws transcend our cognition in degree rather in kind, and are in principle object of progressive, yet fallible knowledge.

The connection between scientific essentialism and things in themselves can be found already in Russell and Sellars.[41] Hanna particularly highlights this point by saying that:

> A microphysical 'real essence' is nothing but a certain kind of Kantian thing-in-itself-a modern scientific version of the noumenon. The 'really real' physical microstructures of the scientific essentialist are not, and never can be, either perceivable by the human senses or accurately describable by means of empirical concepts. Essentialist physical micro-entities and micro-properties may exist in space and time, but only in space and time in themselves, not in Kantian space and time, which are 'pure forms of sensibility,' that is, structures strictly and exclusively applicable to macroscopic objects and their properties. The scientific essentialist is thus a defender of what Kant calls 'transcendental realism.' (Hanna 1998, 512–3)

For Hanna scientific real essences are to be thought as particular kinds of things in themselves that can never be known or described by human concepts. Kreines and Messina have retained this view in their essentialist accounts of laws (see, e.g., Kreines 2008; Messina 2017, 139). While these accounts rightly emphasize the limited epistemic access of our cognition to

[41] See, in particular, Russell 2001 and Sellars 1968.

essences and corresponding laws, they also have the major drawback of making the very project of approximating knowledge of necessity unattainable. If real essences are not in space and time, then our progress in experience can never get closer to it, nor do we have any criterion to tell that we have improved our cognition of them. In other words, to improve our cognition of necessary laws of nature would become a senseless project.

One might be tempted to relax these epistemic limitations and concede that knowledge of real essences *as things in themselves* is indeed possible at the end of inquiry. This reading, however, seems incompatible with Kant's own epistemic restrictions. For Kant, things in themselves strictly cannot be objects of cognition. And admitting a progressive discovery of real essences as things in themselves would make the systematic unity of cognition something in principle completable by our understanding. But for Kant, the systematic unity of cognition is constitutively unattainable for us: no matter how much we advance our empirical investigation, we can only "asymptotically" improve the systematization of our cognition (e.g., A663/B691).

To sum up, taking real essences as things in themselves fails to do justice to Kant's conception of asymptotic approximation to necessity. Such epistemic ideal implies that, although our cognition can be improved (we can 'reduce the distance' between our present cognition and perfectly systematized knowledge), it can never become complete. If we take real essences as unknowable things in themselves, there seems to be no real approximation; if we take them as knowable things in themselves, there seems to be no real asymptote as the investigation of nature will eventually be complete. I wish to suggest that a solution to this quandary can be found if we better define the relation between the notions of real essence and thing-in-itself.

First, it is important to remind that what concerns us here is the origin of the necessity of empirical laws of nature. The grounds of such necessity, as we saw, are the real essences of empirical objects. Following Stang, I have also suggested that real essences are not to be thought as something

other than the empirical objects themselves, but rather as the complex of properties that makes it the case for an instance of a kind to be possible as such. Now, I want to point out that, if this definition is correct, there is an asymmetry between the concept of real essence and the concept of thing-in-itself of an empirical object. Although we cannot know real essences as such, the properties that compose them can be given in space and time as objects of possible experience.[42] The same, however, cannot be said of the properties, if any, of things-in-themselves. Although my point here is not to offer an interpretation of things in themselves—a notoriously thorny issue to deal with, I think it is safe to assume that Kant does not allow for any form of cognizability of them through experience, no matter how partial or incomplete. For Kant, things in themselves are "object of a non-sensible intuition"—what Kant also calls "intellectual intuition" of which human cognizers do not even understand the possibility (B307). And similarly, the thing-in-itself is said to be epistemically independent of any possible experience:

> The true correlate of sensibility, i.e., the thing in itself, is not and cannot be cognized through them [sensible representations], but is also never asked after in experience. (A30/B45)

In short, while the real essence is the complex of properties possessed by an empirical object, the thing in itself would contain, if any, properties that cannot be given in space and time. As such, these two concepts cannot be merely equated. This is not in any way to deny that, for Kant, empirical objects are also grounded in thing in themselves, or that the "entire series" of properties that compose the real essences "could be grounded in some intelligible being" (A562/B590). My much less controversial point is that the grounding relation between a real essence of a kind and an instance of that

[42] It is empirical investigation that determines which properties are 'essential' and compose the real essence of something. Such determination is, however, always revisable and never complete. For this reason, I doubt that, for Kant, we can know with certainty that a law grounded on an essential property is 'necessary a posteriori.' Empirical cognition can, at most, aim at empirical certainty (see *MFNS*, 4:468).

kind is orthogonal to the grounding relation between a thing in itself and an appearance.[43]

Importantly, there is specific textual evidence suggesting this interpretation. In his lectures on logic and metaphysics, Kant clearly locates the rationale of the inaccessibility to fully-fledged knowledge of real essences in our cognition being incomplete rather than in not being able to know essences at all. Take, as examples, the following passages:

> To have insight into the real essence exceeds human understanding. We cannot provide a complete ground for a single thing. This requires a universal, complete experience, and *to obtain all possible experience concerning an object is impossible*; we cannot explain anything in nature a priori and without any experience, because the understanding cannot speculate about that with which it is not acquainted […] When we abstract the marks of our concept, we have the logical essence. But if we investigate the innermost ground of a body, then I will cognize its nature, i.e., its real essence. (*Vienna*, 24:839–40; emphasis added)

> We can never have complete insight into the real essence, e.g., we can never experience *all* the marks of water no matter how far physics advances. (*Dohna*, 24:728)

> It is impossible to find the complete inner real ground of all determinations [...] We often hear the complaint [that] the essences of things are unknown, [that] we are acquainted with only the surface. That is entirely right, but is valid only for the real essence. *We can cognize much that belongs therein, but not everything*. This real essence is nature. (*Mrongovius*, 29:820–1; emphasis added)

Kant's explanation of the unknowability of essences departs from that given for things in themselves. Kant is not saying that essential properties are not object of experience or that we lack the epistemic resources to attempt to cognize them. Rather, he points at the constitutive limitedness or perspectival nature of our empirical knowledge. The problem is that we cannot have complete experience of *all* the properties that constitute an

[43] For a critical discussion of these two kinds of grounding relations, see Langton 2018.

essence, or the properties that belong to a thing *constantly*.[44] In other words, the limit is not represented by the fact that we cannot, in principle, know the inner properties of empirical substances, but that we can never intuit the *wholeness* of such properties neither in space nor in time. Our experience of empirical objects depends on our perspective as finite beings: we can only attempt to enlarge and refine the situated cognition we have.

This epistemic limit is compatible with Kant's notion of asymptotic approximation. Although real essences remain constitutively unknowable in their completeness—there is no such a thing as the end of empirical inquiry—, it still makes good sense to say that our finite cognition of essences can be improved. In turn, this improvement grounds an approximation to the necessity of empirical laws. We can say, for example, that the fact that water is H_2O or that gold dissolves in aqua regia are not mere regularities, but robust laws, grounded in comparatively inner properties. At the same time, the incompleteness of our experience drives the constant revision and enlargement of the properties that compose real essences.

Accordingly, ideas of real essences (of empirical objects) should be regarded as concepts of unreachable totalities of empirical properties rather than of unknowable things in themselves. We can further ask whether Kant offers any resources to illustrate such distinction in greater detail. Unfortunately, if, on the one hand, Kant links essences to reason's demand for the totality of conditions (see, e.g., A694/B722), we do not find any systematic treatment of this problem. I want to briefly suggest, however, that the Dialectic contains the resources to clarify in what sense real essences are to be regarded as ideas.

[44] The temporal limitedness of our access to essences have at least two important implications. First, it implies that our acquaintance with them changes over time. At the time of Priestley, for example, we knew that viscosity was a property of water, but we did not know that water is made of two hydrogen atoms bonded to an oxygen atom. Second, I take such limitedness to point towards the genuine possibility that essential properties *themselves* might change in the future. For an analysis of this problem from a Humean perspective, see Beebee 2011.

In the Dialectic, Kant distinguishes ideas that have to do with transcendent objects (or things in themselves) from ideas that have to do with complete series of empirical objects. Psychological and theological ideas belong to the former class of ideas. In their case, we are thinking objects that are unknown to us, "but not on that account impossible" (A478/B506): for instance, we are thinking a simple thinking substance (soul) or whether there is an absolutely necessary cause of all things (God). Cosmological ideas, instead, concern empirically given objects and the way we can cognize their complete series or totality.[45] As Kant puts it:

> The cosmological ideas alone have the peculiarity that they can presuppose their object, and the empirical synthesis required for its concept, as given; and the question that arises from them has to do only with the progression of this synthesis, insofar as it is to contain an absolute totality, which, however, is no longer empirical, since it cannot be given in any experience. (A479/B507; see also A416/B443)

Since, on my reading, ideas of real essences similarly concern absolute totalities of empirical properties, I propose to include them in the same class of ideas. By contrast with the official four cosmological ideas, ideas of real essences are applied to particular sets or subsets of appearances (matter as such, or particular kinds of matter, e.g., chemical elements or powers) and therefore they are not entirely independent of sensible data.[46] But if such ideas do not have to do with transcendent objects or things in themselves, a meaningful sense of approximation can be vindicated. Kant continues:

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[45] See Allison 2004, 359–60. Kant's distinction between mathematical and dynamical cosmological ideas of reason somewhat complicates things because the latter, as Kant later specifies, involve non-sensible objects (A528–32/B556–60). As already mentioned in Chapter 1 (fn. 6), it is unclear to me whether this distinction implies that all cosmological ideas *can* be seen as concerning totality of empirical conditions or whether Kant is retroactively restricting his claims about cosmological ideas (e.g., A479/B507 quoted below) to mathematical ideas only. An in-depth analysis of such distinction goes beyond the scope of this thesis.

[46] This may be the reason why Kant only briefly discusses this type of ideas in the Dialectic. The Dialectic concerns "pure concepts of reason" (e.g., A321/B378), or ideas that are entirely a priori, whereas I take ideas of real essences to be examples of the broader category of "concepts of pure reason" (e.g., A311/B378). As Willaschek notes, the latter "are concepts that arise from the real use of reason," that is from the general use of reason in relation to objects (Willaschek 2018, 168 fn.).

> Now since we are here talking about a thing only as an object of a possible experience and not as a thing in itself, the answer to the transcendent cosmological question cannot lie anywhere outside the idea, for it does not have to do with any object in itself; and in regard to possible experience, the question asks not about what can be given *in concreto* in any experience, but *rather about what lies in the idea which the empirical synthesis is merely supposed to approximate*. (A479/B507; emphases added)

There is a clear sense of approximation to an idea that deals with empirical conditions. Our empirical synthesis can be indefinitely enriched and revised to get closer to the totality or complete series of empirical conditions. From this, it does not follow that our investigation can be completed. The absolute totality is *as a whole* no longer empirical since it cannot be given to us in any situated experience. Kant fleshes out this thought when he clarifies the kind of transcendence attached to these ideas (which Kant also calls world-concepts):

> These ideas are all transcendent and, even though they do not overstep the object, namely appearances, *in kind*, but have to do only with the sensible world (not with *noumena*), they nevertheless carry the synthesis to a *degree* that transcends all possible experience; thus in my opinion one can quite appropriately call them collectively world-concepts. (A420/B447)

Cosmological ideas, or world-concepts, are transcendent inasmuch as they overstep the possibility of experience not in kind, but in degree. This sense of transcendence aptly describes the type of ‘unknowability’ that characterizes ideas of real essences. We cannot completely know them because we cannot get acquainted with all their spatiotemporal properties (or powers). At the same time, we can attempt to acquire cognition of them and indefinitely extend such investigation in space and time. As a result, empirical laws, which are grounded in our cognition of real essences, can be said to transcend our knowledge in degree rather in kind, and are in principle object of progressive, yet fallible knowledge.

8. Conclusion: no insight into the "inner in things"?

I want to conclude by suggesting that the claim that empirical laws are object of progressive, yet fallible knowledge should not sound surprising. Kant oftentimes remarks that his philosophy licenses (or at least, is supposed to license) a well-grounded notion of empirical realism (see, e.g., A371). Further, Kant's corpus contains explicit denials of the thesis that we cannot know the "inner in things." These denials should not lead us to think that Kant retains a metaphysical view about essences even in his Critical period. Rather, as I have shown in this chapter, Kant rethinks essences in a way that is compatible with the epistemic restrictions of his mature philosophy, and yet affords empirical cognition of them—namely, as ideas of reason. I want to focus, in particular, on a passage (from the Remark to the Amphiboly of the Concepts of Reflection) that recapitulates some key points of this chapter and most clearly dismisses the strong kind of epistemic ignorance that seems to follow from the 'essentialist' account of laws.

In this passage, Kant discusses the possibility of knowing the inner properties of matter (as a phenomenon, or empirical substance). Kant specifies that "comparatively inner properties" are not just the kind of properties that we can cognize, but also the only meaningful properties that we need to investigate. As Kant puts it, "what the things may be in themselves I do not know, and also *do not need to know*, since a thing can never become before me except in appearance" (A276–7/B332–3; emphasis added). "The absolutely internal in matter"—namely, what matter may be *in itself*, abstracting from experience— is "a mere fancy" in empirical investigation (ibid.).[47] But if this is correct, then the skeptical worries that seem to result from an essentialist position collapse. As Kant continues:

> If the complaints "*That we have no insight into the inner in things*" are to mean that we do not understand through pure reason what the things that appear to us might

[47] This is not to deny that, for Kant, there is a transcendental ground of the appearances of matter, but this is "a mere something, about which we would not understand what it is even if someone could tell us" (A277/B333). In other words, determining this ground does not concern us in empirical investigation.

> be in themselves, then they are entirely improper and irrational; for they would have us be able to cognize things, thus intuit them, even without senses, consequently they would have it that we have a faculty of cognition entirely distinct from the human *not merely in degree but even in intuition and kind,* and thus that we ought to be not humans but beings that we cannot even say are possible, let alone how they are constituted*. Observation and analysis of the appearances penetrate into what is inner in nature, and one cannot know how far this will go in time*. (A277–8/B333–4; emphases added)

It is "improper and irrational" to complain that we cannot know what appearances may be in themselves and, thereby, that we cannot have insight into the "inner in things." These complaints would require of us the ability or faculty to cognize objects without sensible intuition. But this faculty of cognition (i.e., intellectual intuition) would differ from ours "not merely in degree but even in intuition and kind." Indeed, we would be complaining about not having a faculty of cognition that cannot belong to human beings at all, and of which we do not know even if it is possible.[48] We can instead acquire cognition of the empirical world without leaving our finite perspective as human beings. As we saw, essences should not be thought as unknowable things in themselves, but as unreachable totalities of conditions that transcend our cognition in degree. It would therefore be a non sequitur to say that, since we cannot know how things are in themselves, we cannot improve our empirical cognition of them (or insight into them). As Kant says, empirical investigation can penetrate into the properties and powers of real essences (or "we become acquainted with the powers of things bit by bit in experience"; *ML*$_2$, 28:553) and extend indefinitely in space and time.

What this passage (from the Analytic) does not mention is that, according to my reconstruction, the investigation of empirical laws of nature is guided by the faculty that demands the totality of conditions for given appearances, namely reason and its ideas. I have argued that reading the problem of the necessity of empirical laws through the lenses of the Dialectic

[48] I do not have space in this chapter to evaluate the claim that it does not make sense to complain about something that we do not know if it is possible. On the (real) possibility of intellectual intuition, see also Zuckert 2020.

allows us to make sense of empirical cognition and progress within the context of an ‘essentialist’ account of empirical laws. Reason does not determine the necessity of empirical laws. Rather, it is the fundamental epistemic faculty that allows us to acquire and improve cognition of laws that are grounded in the essences of things. As such, the proposed interpretation reconciles the epistemological and metaphysical side of empirical laws of nature and ensures the purposiveness of empirical enquiry.

Conclusion

I wish to conclude this long journey through Kant's theory of reason by giving a summary of the key points of my interpretation and briefly highlighting some of the questions that still need to be answered. As we saw, Kant considers the doctrine of the systematicity of reason as an important scholium to his philosophical system, whose details have only been sketched in the *Critique*. Although I cannot claim to have solved all the puzzles of this part of the *Critique*, I hope that the unified approach presented in these chapters suggests some promising insights towards the full explanation and development of Kant's doctrine of systematicity as well as of his general account of scientific investigation.

I have proposed an interpretation of systematicity that aims at reconciling two key aspects of Kant's theory of reason, namely that the doctrine of systematicity is a critically legitimate part of the *Critique*; and that it is indispensably necessary for acquiring empirical cognition. Current interpretations fall short of vindicating these two aspects of Kant's theory of reason. Interpretations that emphasize the legitimate nature of the systematicity of reason tend to regard it as an afterthought to his philosophical system—namely, as some form of heuristics we may use to expand our cognition. Interpretations that highlight the indispensable necessity of reason runs the opposite risk of advancing a transcendent interpretation of its use—namely, a use of reason that oversteps the limits of possible cognition. But as I showed, it is possible to do justice to both tenets of Kant's theory of reason without reducing the doctrine of systematicity to some form of heuristics nor venturing into the territories of transcendent metaphysics.

In the first part of this thesis, I showed that the concepts of reason (i.e., ideas) must be interpreted as having eminently prescriptive value, and that such prescriptive value is not incompatible with their necessary function

in empirical investigation. In particular, I suggested that in order to legitimately use ideas, we need to take them not as concepts of objects, but rather as rules for the empirical use of the understanding. As rules for the empirical use of the understanding, ideas acquire indirect objective validity. That is, they can be legitimately applied to empirical objects *through* the actions of the understanding. In particular, they allow the understanding to maximize the unity and extension of empirical research. In other words, the objective validity of ideas does not consist in an actual or potential relation to objects, but in the function of progressive systematisation of objects of experience they afford.

If this reading is correct, ideas do not rely on claims about transcendent objects for their validity. Relying on claims about objects of which we do not know the possibility is unsatisfactory, for it can at most ground the belief that ideas are objectively valid, but it fails to show that ideas *are* objectively valid. This does not necessarily mean that any use of reason in direct relation to objects (such as 'doctrinal belief') should be banned from reason. As we saw, reason is naturally misled into the illusion that its principles determine things in themselves. While under such illusion, however, reason can avoid taking its principles to be true and thereby escape from metaphysical errors. My more restricted claim is, rather, that ideas of reason can be legitimately used in empirical investigation only if they do not depend on descriptive relations to objects in order to be valid.

More specifically, in Chapter 1 I presented an overview of my reconstruction of the general features of the regulative use of reason. I defended the following claims: that the regulative use of the ideas of reason does not rely on 'transcendental illusion' but replaces it as the proper use of ideas; that such proper use of ideas consists in their use as meta-rules for bottom-up empirical research; that the prescriptive nature of ideas is compatible with their being objective in the relation to the empirical world. In Chapter 2, I clarified the objective validity of ideas while reconstructing the regulative use of a specific idea, the theological idea. I showed that the transcendental deduction of ideas offers us detailed instructions on how to

critically understand the postulation of the idea of God. In particular, I argued that the idea of God obtains objective validity as a schema for the complete determination of objects of experience; and that the content of this idea must be understood in analogical rather than descriptive terms, namely as establishing only a relation to something that remains unknown in itself.

In the second part of the thesis, I developed my account of the necessity of reason in relation to empirical cognition. I showed that the systematicity of reason plays a fundamental role not only as a logical (i.e., in relation to concepts), but also as a transcendental principle (i.e., in relation to experience). Importantly, to say that systematicity is a transcendental principle of reason does not plausibly mean that it is a condition of the very possibility of experience, or experience as such (like the categories of the understanding), but that is a necessary and indispensable condition of experience as giving rise to proper *empirical cognition*. Reason provides fundamental prescriptive conditions for both the formation of concepts and their application to the objects of experience. In other words, it tells us how we *ought* to acquire empirical cognition. More specifically, I focused on three different, yet closely related aspects of scientific investigation: (1) unity of cognition, (2) empirical truth, and (3) necessity of laws.

(1) In Chapter 3, I argued that theoretical reason offers us the conceptual space in which it is possible to pursue scientific cognition. The space of theoretical reason does not prescribe the content of phenomena. Rather, it provides scientists with a template of maximal systematicity of knowledge which grounds the possibility of different, compatible perspectives—either aimed at unity or at disunity of scientific cognition. (2) In Chapter 4, I showed that reason's characterization as a 'touchstone of truth' can be squared with the theory of truth Kant grants and presupposes in his *Critique*: truth as the agreement of cognition with its object. Reason provides us with two essential preconditions for the tenability of this theory at the empirical level (the possibility of formulating empirical concepts and approximating empirical cognitions to truth) and remarkably dovetails with the other criteria of truth that can be found in Kant's corpus. (3) In Chapter 5, I

argued that reading the problem of the necessity of empirical laws through the lenses of the Dialectic allows us to make sense of empirical cognition and progress within the context of an 'essentialist' account of empirical laws. Reason does not determine the necessity of empirical laws. Rather, it is the fundamental epistemic faculty that allows us to acquire and improve cognition of laws that are grounded in the essences of things. As a result, empirical laws are in principle object of progressive, yet fallible knowledge.

But if this reconstruction is correct, it also teaches us an important lesson on Kant's understanding of the role of metaphysics in empirical investigation. As I emphasized in the course of my thesis, Kant does not simply dismiss the metaphysical resources of our mind. Rather, he deeply rethinks them in accordance with the perspectival nature of our knowledge, i.e., its being situated in individual human cognitive faculties. As we have seen, the idea of systematicity originates from the same demand of reason that leads us to transcendent metaphysics—the demand for the unconditioned. Such demand can never be fulfilled given the perspectival nature of our knowledge. But this does not mean that reason has no place in cognition. When limited by the nature of our knowledge, reason's demand for the unconditioned disposes of its baseless transcendent aspirations and becomes a *drive* for cognition that allows the subject to advance in its empirical investigation.

The limitation to the human perspective is a defining aspect of the positive use of reason that often goes underappreciated in the attempts to reconstruct this use. By emphasizing such perspectival limitation, my interpretation has shown that Kant operates a radical transformation of the function of the rational sources of our mind. Their function is not to attempt a determination of things in themselves but is rather to guide the investigation of finite beings *within* the world. In other words, the immanent function of reason is essentially orientational. In particular, by guiding the way the understanding relates to the world, reason does not merely help it formulate additional hypotheses that complete a system of cognitions already given to us. Much more radically, it makes possible any coherent use of the

understanding that goes beyond a mere production of given experience. As such, reason is an indispensable component of any empirical cognition that is not a mere aggregate of particular and unrelated cognitions.

I take Kant's reflections on reason's systematicity to be a precious resource also for contemporary debates in philosophy of science, in particular concerning the perspectivism of scientific cognition. According to contemporary perspectivism, multiple approaches and theories are nothing but different perspectives from which we investigate phenomena. Given our epistemic limitations—the point of view we occupy—science is perspectival through and through, from the gathering and interpretation of data to scientific theorizing proper. In Chapter 3, I suggested that an interesting variation on perspectivism can be found in Kant's doctrine of theoretical reason. While standard perspectivism focuses on the plurality of observational points of view, Kant's 'perspectivism' emphasizes the common space within which different perspectives can be taken up. Reason provides the ideal conceptual space within which we are able to systematise disparate and particular empirical cognitions into scientific knowledge. The complete systematic unity of cognition is not, to be sure, how scientific knowledge looks like according to Kant. The space of reason is, however, the place where finite cognizers can orient their empirical investigations and attempt to progressively approximate to systematic unity.

Whilst I proposed a unified account of Kant's doctrine of systematicity, this does not mean that my reconstruction is complete nor that it is not disputable in many of its details. Several questions remain unanswered in the present work. I want to conclude by briefly mentioning some of the most pressing ones. First, while Kant clearly intends to propose a general reading of the regulative use of the ideas of reason in the course of the Dialectic (most evidently in the Introduction and in the Appendix), it is not entirely clear how such use can be applied to each kind of ideas (cosmological, psychological, and theological) and whether there are significant differences among them. Although I supported my reading with several examples of particular applications of the regulative use of reason, Kant's complex

taxonomy of ideas would require a much more extensive and systematic discussion than I managed to conduct in this thesis. I have also not completely clarified how the 'official' transcendental ideas of reason are related to the particular (or empirical) ideas of reason (such as 'pure water,' 'pure earth,' 'pure air'), nor have I explained the relation between ideas of reason and the principles of reason Kant discusses in the first part of the Appendix (homogeneity, specification, continuity).

Second, I suggested that the doctrine of systematicity is an important part of what Kant calls 'empirical realism.' However, Kant's empirical realism is strongly dependent on assumptions that are characteristic of his mature philosophical position, namely 'transcendental idealism.' As a result, to say that the doctrine of systematicity contributes to empirical realism leaves it open what kind of realism (if any) such doctrine licenses. Fully answering this question requires a much more detailed investigation into the foundations of Kant's philosophical project in the *Critique*. The problem of realism is pressing not only from an exegetical, but also from a contemporary point of view. If we accept that our epistemic limitations fundamentally condition the possibility of scientific knowledge, how can we still maintain that scientific theories really map onto entities and processes of a mind-independent world? In other words, how can we reconcile the perspectival nature of our knowledge with some form of realism in science? While Kant's doctrine of systematicity offers promising starting points for discussion, there is still much interpretative work to be done in order to answer these questions in a contemporary setting.

Finally, the proposed interpretation is by no means a complete reconstruction of Kant's general account of scientific investigation. In my thesis, I only discussed one aspect of Kant's account, namely his notion of systematicity in the *Critique of Pure Reason*. Kant's account is, however, much more complex and it is developed in several other works, such as the *Metaphysical Foundations of Natural Science*, the *Prolegomena*, and the *Critique of the Power of Judgment.* Not only is the doctrine of systematicity just a part of this account, but Kant's answer to how we can investigate

nature and obtain empirical cognition seems to undergo a significant change from the *First* to the *Third Critique*. In the *Critique of the Power of Judgment*, Kant notoriously reassigns systematicity to reflective judgment and its principle of purposiveness. In this text, reflective judgement is revealed as the faculty that allows us to presuppose that nature is purposive for our cognitive faculties so that we can meaningfully order it into laws. Despite the significance of such reassignment within his philosophical project, Kant does not offer any explanation for it. Scholars starkly diverge in interpreting the kind of relation existing between these two texts. While I believe that key insights of my reconstruction suggest some form of continuity between the solutions presented in the two texts (see, especially, Chapters 1, 4, and 5), a careful analysis of the development of Kant's views lies well beyond the scope of the present work. Uncovering the reasons that led Kant to make this change as well as completing Kant's doctrine of systematicity with the other parts of his philosophy of nature would however be necessary steps to understand Kant's account of scientific investigation in its entirety.

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